

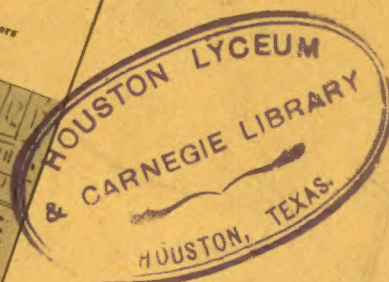
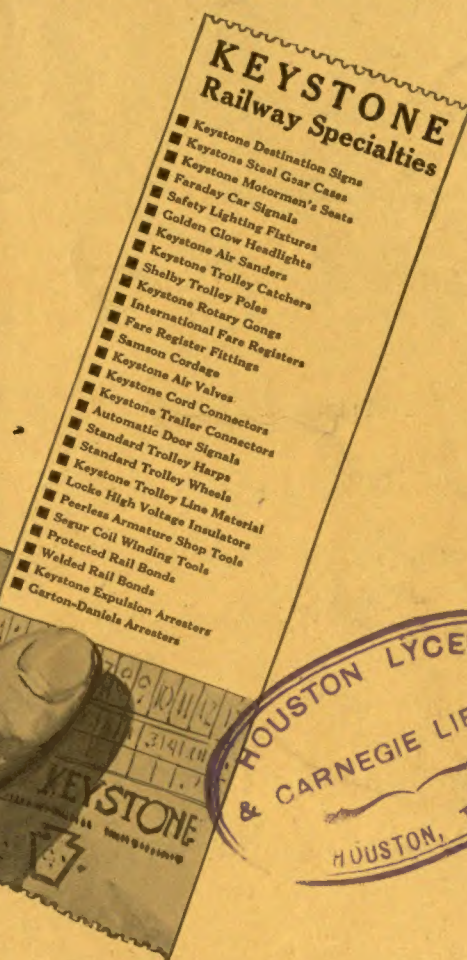


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Westinghouse

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors

HENRY H. NORRIS, Managing Editor

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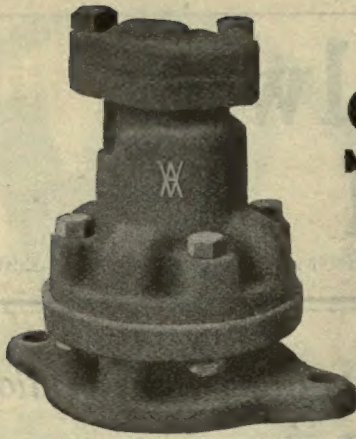
Reporting a Convention

ONE of the services which the "Electric Railway Journal" gives its readers is the prompt reporting of conventions. Much of the value of a convention report is lost if it is not published soon after the close of the meeting. The papers and discussions are usually of a timely nature, and not only are they apt to become obsolete if withheld too long, but if they contain suggestions of value the sooner these can be disseminated and applied, the better it is for all.

When a convention is held elsewhere than in New York, "Electric Railway Journal" goes to large expense so that it may publish the report during the same week as that in which the convention is held.

In order to get not only the matter-of-fact report and have it written and ready immediately, but to get the most adequate interpretation of what goes on, several of the editorial staff are usually required. At the Midyear Meeting at Indianapolis this week, for example, five editors were in attendance. In addition there are usually large telegraph and telephone costs, and finally, the composition and press-work for convention reports is extra heavy because of the quantity of matter which has to be set in type and printed in the shortest possible time.

The "Electric Railway Journal" takes pride in the promptness and accuracy with which it reports conventions. Its ability to do this has been acquired through many years of experience.



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SQUAWK! 'TROLLEY'S OFF'

Parrot Warns Car Crews Who Pass Hotel. (Plain Dealer Special)

May 23.—Crews on the line operating in have little cause for worry from jumping trolleys in crossing the Pennsylvania tracks, at least not as long as Jim Gilmore's trained parrot is on the job.

The parrot is perched in one of the front windows of the Manhattan hotel at the railroad crossing and as a trolley jumped the wire, which is quite often, the parrot squawks "trolley's off."

The bird has become so accustomed to hearing the hotel guests, seated in front of the building, notifying the car crews that it soon picked up the familiar cry. — From Cleveland Plain Dealer

High wire and bumpy tracks conspire to make the trolley wheel jump often at railroad crossings. And when the day does come when a train is coming and the trolley is off—imagine the conductor fumbling his rope, the locomotive engineer screeching his brakes, passengers scrambling for the doors, breaking through the windows—

But if National Trolley Guard is overhead, the car will go on across and be out of danger without a second's delay.

National Trolley Guard is a trough of open wire mesh inverted over the trolley wire. Whenever the wheel jumps off the wire it runs on the Guard which supplies power to carry car and passengers to safety.

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Elreco Combination Poles *Make an ideal white way installation*

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The usual objection to the erection of "white way" lighting, the objection to the first cost, is done away with in Elreco ornamental combination railway and lighting poles. This construction carries the span wires of the street railway, the lighting wires and the ornamental lamp standards.

The cost may be divided between the street railway, the lighting company and the business interests facing the street.

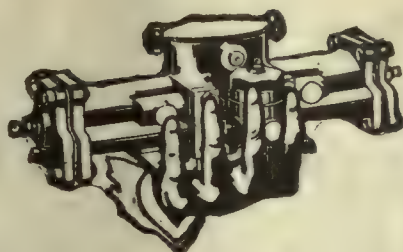
Besides making the expense a very moderate item, the best type of illumination is provided in this way. One Elreco pole carries the wires and lamps, avoiding duplication of poles and wires and reducing the overhead obstructions. There is no necessity for two pole lines on any street, whether the object is intensive lighting, as in the designing of white ways, or whether the installation is an ordinarily lighted business or residence street.

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Cincinnati, Ohio

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Phono-Electric

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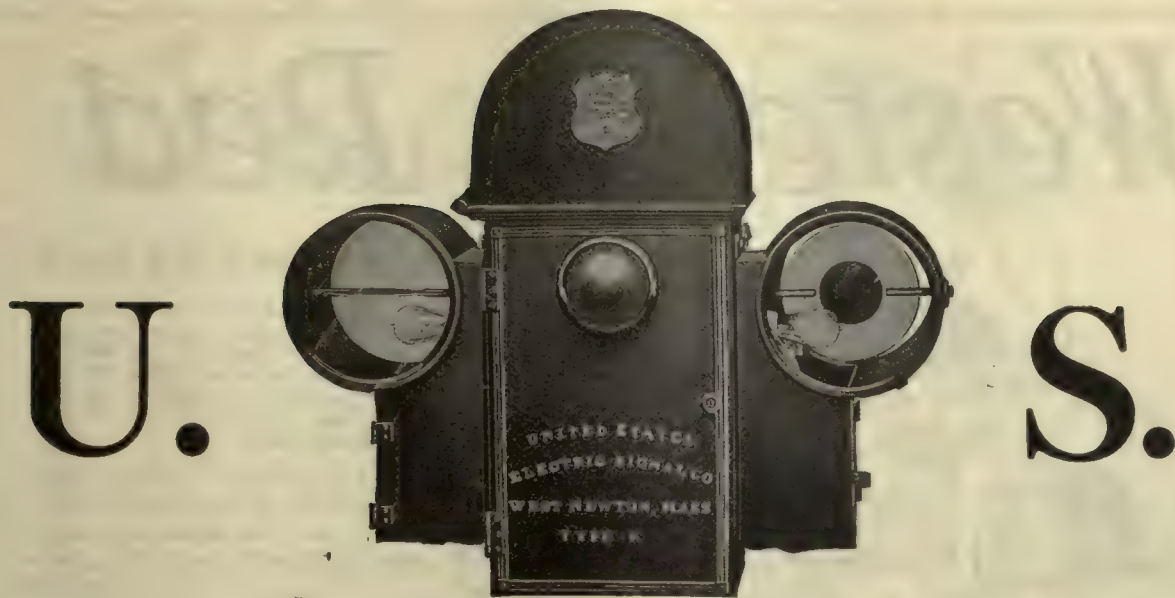


In December, 1913, Phono-Electric 2/0 trolley wire was installed in Bridgeport at Main Street and Fairfield Avenue, the heaviest "traffic" corner in all New England. At this corner there has been a daily average of over 2500 cars pass under Phono-Electric for the past seven years—

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Bridgeport **Connecticut**



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and

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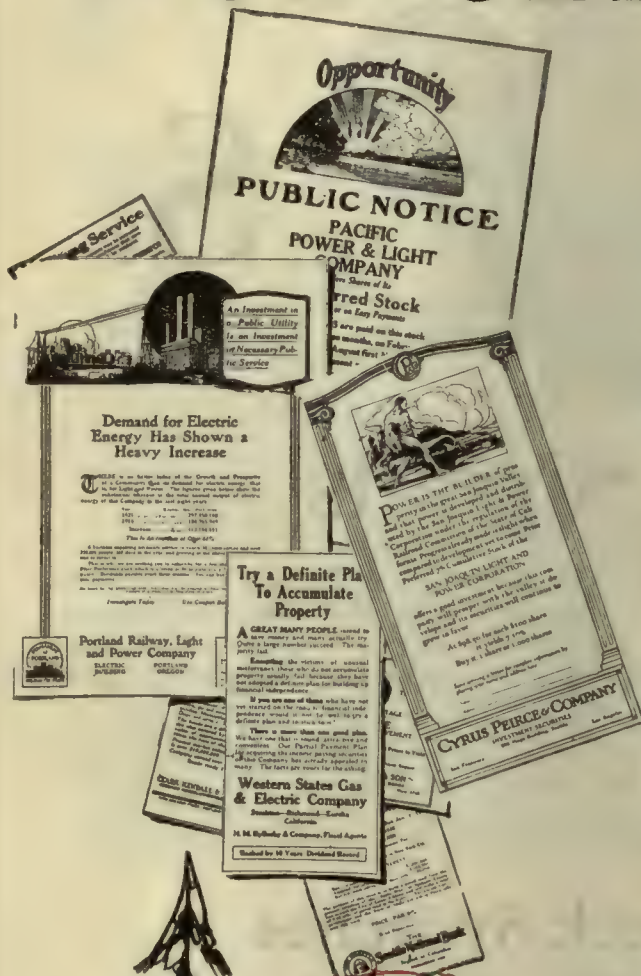
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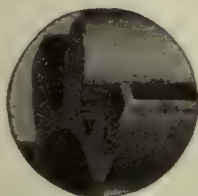
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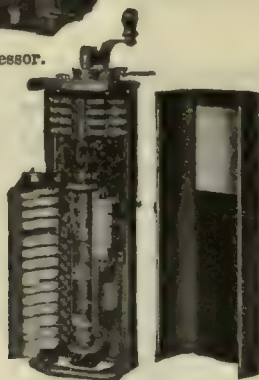
81 in Boston



Type of safety car in operation in Boston.



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K63 Controller.



GE-264 Sleeve Bearing Motor.

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Volume 59

New York, Saturday, March 4, 1922

Number 9

The Value of Midyear "Conferences" Is Once Again Proved

A GREAT midyear conference has passed into history and has given additional proof of the wisdom of starting these midyear meetings of executives to discuss outstanding problems of the day. There was actually more discussion this year than before—it was more of a conference—and every one in attendance felt fully repaid for the time and money expended.

There was one interesting feature this year which should be repeated in future years. This was the practical setting aside of a full day—Monday in this case—for committee meetings. What this has done has made the Midyear Meeting even more of a "conference." It seemed that at least half of the total of those attending the meeting were in Indianapolis on Monday. There were dozens of informal conferences. There were six simultaneous committee meetings. In other words, the Indianapolis meeting proved a valuable opportunity for discussion of problems of the day, and for refreshing one's viewpoints on his own work.

The association's executives should be congratulated and commended for the manner in which this conference was planned and carried out.

Railways Will Make Greater Use of Bus Transportation

A GROWING use of buses by electric railway companies may be expected in the immediate future if one may judge from the general attitude of railway officials at the Midyear Conference this week. It was very apparent that railway executives see the need to use the bus and there is progress in analyzing the field of its application.

There was agreement among a very large majority of the executives that the monopoly principle in the business of supplying transportation service must prevail if the public is to be given the best service and the interests of all others concerned are to be best served. For this reason the bus, in railway areas, should be developed as a co-ordinated expansion of service.

Mr. Shoup, speaking from and of his experience in California, presented the view that co-ordination of bus and railway in that state—at least any mention of co-ordination or co-operation between present companies—is utterly impossible. The bus in California, he says, has been developed so far in a competitive way that the interests of the two are hopelessly divergent and that the situation there is a fight and a bitter one. He has small expectation, too, of any extensive bus development by railways even were the independent companies eliminated.

In New Jersey a similarly large development has taken place—the railways watch 25 per cent of the riders use the bus. But Mr. Danforth is not so hopeless as Mr. Shoup in seeing daylight ahead in a proper co-ordination of the two services.

In both of these states the independent unco-ordinated

bus development is so extensive that railways in other states may well take these as examples from which the lesson may be drawn that the opportunity for them to undertake bus development as a co-ordinated part of the transportation monopoly is a fleeting one which exists today but may be gone tomorrow. California and New Jersey were the first places where the bus growth became formidable to the railways. The executives in those states concentrated most of their energies toward exterminating the bus on account of its competition rather than toward devising ways and means of guiding its coming as an ally. This is stated without the slightest intent to criticise, for these men were beset with the problem in its original aspects; it was all "jitney" and little "bus" at first. The remainder of the industry now has the benefit of the experience in California and New Jersey and the benefit of all the individual and concerted thinking and study that has been given to the problem in these last two or three years. It seems not improbable that, had this knowledge of the bus and the opportunity to stand off at a distance and look at the problem been afforded to the California executives as, in general, it has been afforded to those in other parts of the country, there would now be the general status of bus operation by the railways or in conjunction with them in California and New Jersey instead of the opposite.

The question now is: Will railways grasp the opportunity while it exists? Neither co-ordination nor monopoly is likely as a natural course unless the development of the bus is guided in that direction. This "guiding" means that the railways should inaugurate the use of buses themselves where there is a field for them. This will avoid the development of a competitive situation, costly to all, and will satisfy the desires of the public.

Expenditure of Time and Money in Selecting Employees Brings Big Returns

ELECTRIC railways are eager to put into effect any suggested plans which promise to insure a better grade of employee. This explains the interest in the co-operative study which is being made by the Transportation & Traffic Association's committee on personnel and training. There is no line of effort which may yield greater direct or indirect return than this.

The part of this subject which most needs attention now in selection rather than training of employees. The latter inherently demands just as much investigation, but electric railways have lately given more attention to it. One reason for this is that for a time there was difficulty in securing enough employees to keep the cars running, so that no comprehensive system of selection would have been of any use. The situation is different today.

Consider the money aspect of the matter. A conservative estimate of the amount of wages paid to platform men alone in the employ of the electric railways of this country is about \$200,000,000. Suppose

railway operators have not decreased their service as much as the loss in traffic would possibly justify, but on the contrary have given consistently a slightly better service in proportion to the traffic than that given before the decline in traffic. This is clearly shown in the month by month figures for car-miles operated, the maximum decrease in which was 5½ per cent, which was not reached until January, 1922, the average decline of the previous months being approximately 3 per cent.

These figures and other facts about the industry make our outlook encouraging. The underlying condition of the industry is sound. Apparently the economic pressure on the industry is being relieved. Furthermore, the general public, in whose hands after all rests our future, is understanding our problems better every day.

We are beginning to see the light in many quarters, but herein lies a great danger. Because the clouds are beginning to lift we must not decide that all

will be well and supinely cease our efforts toward better service and better understanding generally.

It behooves us as individual members to make the best possible use of the machinery provided by our association for aiding us in the solution of our problems. We can best work out our own problems by learning what methods other companies have used to solve problems similar to ours, and it is in assisting the individual companies to obtain this information that the association is well fitted to serve. The association has facilities for furnishing information about virtually every problem that arises on any property. Whether your question is one of operation, construction or finance, the association can and will gladly help you. Through its Bureau of Information and Service it will supply facts and suggestions regarding wages, fares, franchises, public regulation, publicity and advertising, the motor bus, the safety car, and a thousand and one other

questions which today are uppermost in the minds of electric railway operators and executives. The association headquarters in New York are a storehouse of information from which every member can draw help without special charge of any kind.

I would strongly urge that all of our members avail themselves to the fullest of the opportunities which are here afforded. If the association does not have the sort of thing that you feel is needed, suggest subjects of study and research problems and the work will be gladly undertaken.

Just in proportion to the use we make of the opportunity to better our service and tell the public the facts about it will we progress and prosper. We must not only keep our house in order but we must let our lights shine brightly that the world may see and understand. And when we have done this we need fear nothing that any person may say about or do to us. The clean house which all can see tells its own story.

Most Successful Midyear Conference

Nearly Seven Hundred Gather at Indianapolis for Interesting, Meaty Discussion of Present Day Problems—
The Correlation of Trackless Transportation and Railway and the Elimination of Unfair
Tax Burdens Were Principal Topics—Dinner Addresses of Exceptional Quality

THAT the latest convention was "the best the industry ever had" has been said so many times as to have a tinge of "triteness." But to say otherwise about the Midyear Conference of the American Electric Railway Association held at Indianapolis on Tuesday of this week would fail to indicate that which is actually true.

And after all, this saying of "the best ever" frequently is accurate and is an indication of the unaltered progress of the industry.

At any rate the Claypool Hotel at Indianapolis was the scene of a most successful midyear conference, nominally held on February 28, but whose corollary activities started Sunday, Feb. 26, and ended not until Wednesday, March 1.

An attendance of nearly 700 was recorded at this meeting of such general interest. On Sunday, two days before the conference, large groups had gathered for the committee meetings which were to be held on Monday. A complete record of these is given elsewhere in this issue. And Monday was a day full of committee meetings, there being at least six held simultaneously during the afternoon. The hotel lobbies and corridors were full of railway men exchanging ideas and experiences.

The big day, of course, was Tuesday, when sessions were held which called forth later comments that "this was a real meeting and the subject matter was 'real stuff.'"

There were two sessions and an evening dinner.

The morning session was called to order at 10:32 with President Robert



Gov. W. T. McCRAY

I. Todd in the chair. In an address of welcome Governor McCray said that Indiana stood out pre-eminently as the home of the interurban railway and that he had never heard the statement contradicted that more interurban cars were loaded and unloaded in Indianapolis than in any other city in the country. Further, he said that no doubt the way the state is improving its roads is proving detrimental to these interurbans but he affirmed his belief that the industry is fair minded and also that the state should continue its road work even though these good roads afford a means of direct competition. The railways also pay a considerable amount of their revenues in taxes and also for paving and it is to the interests of the state to safeguard the interests of the industry. A corporation is necessary for the conduct of the affairs of such a large industry and these corporations are entitled to

fair consideration just as anyone else. Indiana is trying to do so.

C. L. Henry next reported on the amendment to the constitution that heretofore had prohibited employees of non-member companies from becoming individual members. Under the plan, which was approved by the convention, that part of Section C of Paragraph IV of the constitution applying was eliminated, so that in the future the executive committee has the sole right to elect candidates to individual membership.

The subject for discussion at this session was the co-ordination of trackless transportation in the future service of the electric railway industry. There were four addresses on the program, each of which covered this question from a different viewpoint.

C. D. Emmons, Baltimore, compared city service in England with that in this country and gave some interesting figures as to operating conditions as drawn from his recent trip abroad. He also pointed out that in England the transportation systems were a monopoly and that there was no thought that the bus would supplant the rail service.

The next speaker, E. B. Whitman of the Maryland Public Service Commission, told how in his state the commission was attempting a co-ordination of services under a unified system in Baltimore and of the rules under which motor bus operation was permitted in other parts of the state. In Baltimore the commission had agreed, although the fact was not yet announced to the public, to allow 10-cent fares on the North Charles Street bus line if the

United Company would put in some "honest-to-God buses."

Harry Reid, Indianapolis, discussed motor-bus and motor-truck operation from the interurban viewpoint. He believed that joint tariffs with truck operators would afford the farmer a chance to get his supplies to market at a lower cost than if trucked entirely over the highway. The plan would also enable the people in outlying parts of the country to receive shipments from the cities more quickly and at a lower cost.

The last speaker, Paul Shoup, Pacific Electric Railway, told of the motor bus situation in California and stated there could be no co-ordination of railway and bus in California now, as the interests of the latter are diametrically opposed to those of the railway in every respect.

An abstract of each of these four addresses is given elsewhere in this issue.

The report of the committee on co-operation of manufacturers in the interest of electric railways was presented by E. F. Wickwire, chairman. This report outlined a comprehensive plan whereby the manufacturer of materials used by the electric railways could aid the railway industry. This plan called for the dissemination of information concerning the industry through house organs and circulars not only to employees but to the stockholders in the manufacturing branch. He pointed out that only by general education can the public be taught the true situation that confronts the industry. By pyramiding all possible means of education of the public is one of the ways that will aid the industry. A more extended abstract of the report is given elsewhere in this issue.

Discussion on Relations of Railway and Bus

After the presentation of the four papers at the morning session on the relations of the railway and bus forms of transportation, the subject was discussed by Arthur W. Brady, Edward A. Dana, W. J. Flickinger and R. E. Danforth. Mr. Brady, Union Traction Company of Indiana, made the point that if we can convince the representatives of the public of the unfairness of subjecting the electric railways to the high taxes involved in the construction and maintenance of the highways for the use of the nearly tax-free highway common carrier, it should then be possible to bring about a parity of conditions under which railways and bus can operate without any injustice. That is all the electric railways ask, Mr. Brady said, in working out the solution of the competitive situation.

Mr. Dana, Boston Elevated Railway, spoke of the evidence afforded by this meeting of the value of the association in bringing out the different experience and viewpoints. He mentioned the study of the transportation situation made by the New England Street Railway Club which was recently

completed (see *ELECTRIC RAILWAY JOURNAL* for Feb. 11, 1922) and said that the conclusion reached was that the electric railways must take hold of the bus as one of their tools of service. In Massachusetts there was an early realization of the need for monopoly and that the municipalities had been prompt in restricting competition so that the railways of the state are in a rather fortunate position in this respect. This early appreciation of the monopoly idea was undoubtedly brought to the fore by the participation of the State in the traction business through the trustee control. An installation of a bus line has recently been made as an auxiliary to the Boston "L," and Mr. Dana thought it was along this line that the use of the bus must be developed.

Mr. Flickinger, Connecticut Company, reviewed the jitney difficulty in Bridgeport briefly and told how this led to the law placing such transportation agencies under the jurisdiction of the state commission. He characterized the jitney operators by stating that of the 500 or 600 applicants before the commission for certificates of convenience and necessity only about 10 per cent were American citizens. The commission has followed closely a set of principles which it drew up as an initial step in undertaking bus regulation, making it the practice that wherever an existing railway is providing adequate service or can be made to provide adequate service no permit will be granted a bus line.

Mr. Danforth, Public Service Railway of New Jersey, said that many of the bus lines operating in New Jersey are earning enough profit to pay for a \$4,000 bus in one year, and others are earning so little that they are changing hands three or four times a year. The Legislature passed a law last year requiring that bus lines must get a permit from the commission. But the bus operators get a permit to operate from some small town to the larger center and then operate into the latter over a car line street. They are permitted to do this provided they do not pick up passengers in the competing territory, but they do not observe this regulation.

There are 1,250 buses operating in New Jersey in competition with the railway. They carried last year one-fourth of the total riding public. This means that the car riders had to pay 1 cent to 1½ cents more carfare than they would without this competition. The patrons do not like to pay 8 cents and can't see why the fare cannot be put back to 5 cents, thinking that the lower fare would put the jitneys out of business. The company has been unable to find that the lower fare would not result in an even lower net earning.

The company feels that it cannot expect much relief from the Legislature, for the 1,250 individual owners have a sympathy and influence that it is difficult for a corporation to match. Public officials wonder why the railway does

not go into the bus business, but it is realized that the corporation would have to give better service in better buses than the individual operators and that the service would therefore be more costly and a profit unlikely. But Mr. Danforth said that there is the consideration that when 25 per cent of the riding public has become accustomed to bus service, the railway company may be forced to operate some buses even at a loss; that it may be advisable to do this for the sake of stabilizing the whole situation. If it would not have this influence, there is no reason for the railway to get into the bus business.

Mr. Danforth questioned the advisability of the railways sticking their heads in the sand as to this problem and rather advised that by making use of this new mode of travel in a reasonable way, it ought to be possible to satisfy the public that the railway is up to date. The main thing is to preserve or establish a monopoly, whatever vehicle is used, for this is to the best interest of the public also. It may also be possible to show that the street car is the best and cheapest, by giving examples of the other, properly supervised and equipped.

Afternoon Session

The afternoon session was opened by the address of Hon. J. W. McCardle, chairman Public Service Commission of Indiana. Though the next speaker, Fielder Sanders, Cleveland, Ohio, had prepared the paper "Unfair Taxation Methods and How They May Be Eliminated," he said he would assume all those in attendance would read it and he would touch on the high points in other words. This was an assumption, he said, that a lawyer never takes in presenting a brief to the court, for otherwise his efforts might not have a fair chance of being useful. Continuing, he dwelt for a time on the importance of good public relations and then showed how a company operating under a service-at-cost franchise derives a certain amount of benefit from this form of contract because the public seems to gain a more intimate knowledge of how the business is conducted and what its troubles are. Taxation is only one of the numerous injustices that will be corrected by a correlation of the interests of the public and of the railways. Service-at-cost brings home to the people that they pay the taxes and it educates the people about the railway so much that they tell the railway, "We pay the taxes ourselves."

In the discussion that followed Ezra B. Whitman, Baltimore, recited specific instances of how a certain railway manager in his city had built up and maintained excellent public feeling by personally attending to the troubles of dissatisfied customers.

R. B. Stearns, Eastern Massachusetts Street Railway, claimed that there exists too much centralization in public relations work—it should be decentralized. His idea was that a car

crew should be urged to consider their car as a vehicle of their own, and that in this way increasing their responsibility, they will handle the people with greater courtesy, safety, etc. Turning the company's \$1,000,000 deficit into a \$1,000,000 surplus over operating expenses for 1921 was due largely to the contact maintained with business men and newspapers.

J. H. Hanna, Capital Traction Company, claimed that the reaching of an agreement on the bus problem also hinges on getting the public point of view properly focused.

Arthur W. Brady, Anderson, Ind., then moved the adoption of the following resolutions:

RESOLUTION REGARDING TAX EXEMPT SECURITIES

Whereas, our present policy of Federal taxation has undergone a radical change from indirect to a system of direct taxation which relies chiefly upon levying a high rate of income tax upon those of large income, thereby causing a constantly increasing volume of capital to be diverted into the non-taxable securities of the Federal, state and minor sub-divisions of government, and

Whereas, this diversion has proved a serious handicap to productive enterprise by reason of the fact that, while exempting large incomes from the payment of taxes they would otherwise be obliged to pay and placing an unfair burden of taxation upon those who cannot benefit by such exemption, it gives an unfair competitive advantage in the money markets to the exempted securities, and

Whereas, the earnings of electric railways are limited by public regulation and consequently have been and still are insufficient to attract necessary new capital in competition with tax exempt securities so that they are now being forced to furnish inadequate and unsatisfactory service, which situation will undoubtedly grow worse rather than better if present tax conditions continue, and

Whereas, this situation can be corrected and the public properly served only by removing the competition from tax exempt securities or by making further and in many cases material increases in the rates charged by such utilities for their service. Now, therefore, be it

Resolved by the American Electric Railway Association that it recommends that necessary corrective legislation be provided to remove the present inequitable burden of taxation and to make all income from whatever source and in whatever form bear its just proportion of the cost of government and remove the discrimination now prevailing between securities of the Federal, state and minor sub-divisions of government and those of private enterprise.

In the discussion on this resolution W. H. Maltbie, Baltimore, criticised the statement that "the situation will grow worse rather than better if present tax conditions continue," pointing out that opposition in state legislatures would probably arise against any change so that the passage of a constitutional amendment would take a long time. Mr. Brady, however, did not think the expression should be modified. The resolution was then passed unanimously.

President Todd then announced that the next feature was a drill by the "first aid drill team" of the Chicago Elevated Railroads. An account of the purpose of the company in organizing this team and the extent to which first aid training had been adopted in Chicago was given by John J. Moran of the Chicago Elevated Railroads, in the absence of Mr. Budd. The squad of men then made their appearance. They were sixteen in number, besides the

captain, and were dressed in white duck. A number of means of giving first aid were then given by the squad in an open space in the middle of the hall. The delegates frequently applauded as the men went through their evolutions. These included demonstrations of the following:

Sylvester method of resuscitation.

Schaeffer prone pressure method of resuscitation, done first by one man and then by four men.

Triangular bandage of the head.

Roller bandage of the hand with arm sling.

Triangular bandage of the shoulder and roller bandage of the face.

Roller bandage of the arm and tourniquet to control bleeding.

Stretcher drill.

Rescue from fire.

Rescue from electric current.

At the close of this demonstration, the president announced the close of the meeting.

At the evening dinner, there were about 650 in the main hall and some fifty women guests in another dining room. These ladies later joined the men to hear the addresses of the evening.

Harry Reid, chairman of the dinner committee, provided continuous entertainment during the dinner in the way of musical numbers by the Girls' Glee Club of Butler College and the Boys' Glee Club from Culver Military Academy. Between addresses after the dinner, there was an entertaining series of tableaux presented by the military students, depicting the genesis and development of military music and instruments.

President Todd proved an able and efficient toastmaster in his apt introductions of the three speakers of the evening. But first he made an introductory address of welcome to Indianapolis and pointed also to the present encouraging status of the electric railway industry.

He then introduced, in turn, the three speakers, Hon. W. D. B. Ainey of Pennsylvania, Samuel J. Insull of Chicago, and Mrs. Antoinette Funk of Washington, D. C. President Todd's address and the addresses of Mr. Ainey, Mr. Insull and Mrs. Funk all appear elsewhere in this issue.

After the speeches were finished, those who desired enjoyed dancing until late in the morning.

Meeting of the Executive Committee of the American Association

Convention for 1922 to Be Held in Chicago During First Week of October, with Exhibits as a Feature—Publicity Men's Advisory Committee Authorized—Committee Expenses Not to Be Paid By Association

A WELL-ATTENDED luncheon meeting of the executive committee of the American Association was held at the Claypool Hotel, in Indianapolis, on Monday, Feb. 27.

After an approval of the minutes of the previous meeting, Executive Secretary J. W. Welsh presented a long report which is abstracted elsewhere in this issue. The executive committee approved his recommendation that he or some other official representative of the association attend meetings of state and sectional railway associations whenever possible.

J. G. Barry presented the report of the finance committee, and gave the audit for the first quarter, under the new system of four audits per year.

The auditors reported that the books of the association are now kept in an excellent accounting condition so that a correct audit may be made at any time. The auditors further stated that the method now in use for safeguarding the association's funds and controlling expenditures from the funds is adequate and businesslike.

In the report of the policy committee, forwarded by Mr. Budd, the chairman, there were outlined the reasons why the executive committee believes it is the best policy not to pay expenses of committee members to committee meetings. This report of the policy committee is

to be sent to all member company executives. It is printed elsewhere in this issue.

C. L. Henry reported the recent activities of the committee on national relations. This committee, he said, is in constant touch with national developments and legislative progress. He spoke particularly of the Bacharach bill, about which he thought there had been undue excitement, and of the bill providing for the sale of mileage books for railroad transportation. In its present wording this latter bill would probably include electric railways, but whether the provision was intended or will be allowed to remain is being followed by the committee.

The report of the publicity committee was presented for Mr. Shannahan, the chairman, by T. C. Cherry. The publicity committee made the definite recommendation that there be established a Publicity Men's Advisory Committee, to consist of nine active publicity men, with Labert St. Clair, director of the association's advertising section, as chairman. This committee would have round-table conferences as to ways and means, and would make recommendations to the main publicity committee. This recommendation was approved by the executive committee and the appointment of the advisory committee was authorized immediately.

A report of the convention exhibit and location committee was heard. This committee reported a canvass which showed almost unanimous approval of having exhibits at the 1922 convention; and recommended that the convention be held with exhibits and at Chicago, during the first week of October, 1922. The exhibit would be held at the Municipal Pier and headquarters would be at the Drake Hotel. This recommendation was unanimously approved by the executive committee, provided that certain minor details, not yet finally completed, could be taken care of satisfactorily.

A report of the committee on company and associate membership was presented by F. R. Coates, chairman. This report showed a net loss of one company member since Jan. 20, and gains in other classes of membership. Mr. Coates also mentioned the committee's activities in getting new members, such as the preparation of a booklet reciting the advantages and necessities of membership, etc.

It was voted by the executive committee that the examining or approving committee on applications for individual membership be the committee on individual and company section membership, Martin Schreiber, chairman.

The executive committee named a committee consisting of J. H. Pardee, chairman of the finance committee, the four presidents of the affiliated associations, F. E. Webster, C. G. Rice, C. S. Kimball and L. H. Palmer, and Executive Secretary J. W. Welsh to make recommendations regarding past-presidents' badges for affiliated associations.

H. G. Bradlee presented a resolution, prepared by the joint committee of the national utility associations, having to do with the question of the tax-exempt securities. This resolution was approved by the executive committee for action by the main association at the Mid-year Meeting on Tuesday.

A question of possible modification of the method of assessing dues was referred to a joint committee, to consist of the finance and policy committees.

Other reports were heard from the dinner committee; the subjects and meetings committee; the committee on co-operation with state and sectional associations; the mail-pay committee; the committee on co-operation from manufacturers; all of whom reported progress but requested no particular action.

Those present at the meeting were: President R. I. Todd; vice-presidents, C. D. Emmons and F. R. Coates; operating members-at-large, P. S. Arkwright and W. H. Sawyer; manufacturer members, J. G. Barry, T. Finigan, L. E. Gould and George H. Tontrup; president of affiliated association, L. H. Palmer; past-presidents, A. W. Brady, C. L. Henry and John J. Stanley; Executive Secretary J. W. Welsh; T. C. Cherry for Vice-President J. N. Shannahan; W. V. Hill for Paul Shoup; Carl H. Beck for C. R. Ellicott; L. C. Datz for President Kimball; and the following guests: Harry Reid, E. F. Wickwire, Myles Lambert, H. J. Kenfield, H. W. Blake and H. V. Bozell.

Report of Secretary and Treasurer*

In Extended Analysis of Work of Association, Executive Secretary Summarizes Committee and Other Regular Activities, Including Co-operation with Government Agencies

By J. W. Welsh

Executive Secretary American Electric Railway Association

THE standing committees on policy, finance, national relations, subjects and meetings, publicity, and publications, as well as the continuing committee on company and individual membership have been organized and are functioning in the regular manner. As reports have been made from time to time to the executive committee by these committees, no special reference to their work is made at this time.

This year several important special committees have been authorized as follows: On trackless transportation, on education, on co-operation with manufacturers in the interest of electric railways, on co-operation with state and sectional associations, on special taxes. All of these are making extensive investigations and researches into these subjects, which are most vital to the industry. The continuing special committees on valuation, mail pay and electrolysis have been reappointed.

The association continues to be a member of the National Chamber of Commerce, the National Industrial Conference Board, the American Engineering Standards Committee and the National Safety Council, and is co-operating with the other utility associations through a national joint committee.

The activity of the association's bureau of information and service continues at approximately the same rate as during the previous year, when approximately 9,700 requests were received and answered. Since the October

By carrying out a policy of summarizing as far as possible in a service letter information to be furnished to member companies, it has been possible to keep within reasonable limits the number of circular letters sent to member companies. In general, the service letter has gone out on the first of the month and has included the announcement of the association's special reports and compilations available to member companies, as well as general items of information for the benefit of member companies. This, of course, does not include the publicity material prepared by our advertising section sent in general to the publicity mailing list of our member companies, which has been necessarily somewhat more voluminous. An effort, however, has been made to analyze carefully information sent out in order that companies may not be unduly burdened with a multiplicity of letters.

Since the first of the year President Todd has delivered addresses before the American Gas Association at its annual dinner in Chicago on Nov. 10, and before the New England Street Railway Club at its dinner in Boston on Feb. 2.

Your executive secretary also made a talk before the Providence Company Section at its meeting on Feb. 9. Your executive secretary also attended the annual meeting and dinner of the New York Electric Railway Association, held in New York City on Jan. 24, and the

RECENT SPECIAL ASSOCIATION QUESTIONNAIRES

Subject	By Whom Sent	Date Sent
Excess Profit Tax.....	Excess Profit Tax Commission	Nov. 7, 1921
Pole Statistics.....	Member Company	Jan. 4, 1922
Interurban.....	Agricultural Comm. Association	Dec. 28, 1921
Working Conditions of Trainmen.....	Association	Dec. 30, 1921
Railroad Ties.....	Member Company	Jan. 3, 1922
Design Track Construction.....	Way Matters Committee	Jan. 25, 1922
Helical Gearing.....	Equipment Committee	Feb. 14, 1922

convention, the following requests have been answered each month: October, 918; November, 752; December, 920; January, 590; making a total of 3,180, or at the rate of approximately 9,500 per year. The subjects which have called forth the greatest interest are those relating to motor-bus operation, regulations covering jitneys, and the standard reports on fares and wages.

Since the beginning of the association year, a total of seven data sheets have been sent out, of which three were requested by committees, two by member companies, one by the federal government, and one on the initiative of the association. Above is given a list of these questionnaires.

*Abstract of report presented to the executive committee of the American Electric Railway Association, Indianapolis, Ind., Feb. 27, 1922.

annual meeting and dinner of the Central Electric Railway Association, held in Indianapolis on Jan. 26 and 27.

It is believed that your executive secretary should take advantage of opportunities to come in closer contact with the various state and sectional associations at these annual meetings, as well as to visit the properties of member companies in order that the association headquarters office, especially the bureau of information and service, may be kept in closer contact with the current problems that are before the industry.

P. W. McGovern has been the local assistant to Charles L. Henry in charge of the Washington office for the last two years. During this period Mr. McGovern has carried on his work faithfully and, it is believed, successfully.

As previously reported by the committee on publications, the magazine is at present without an editor, and Labert St. Clair, in addition to his other duties in charge of the advertising section, has been acting in this capacity. The magazine, however, is now being conducted on a very economic basis as a number of changes in its mechanical set up affecting its general style and appearance have been made. Since the beginning of the association year, however, the number of pages has been expanded somewhat over the minimum of ninety-six pages, which was maintained for a number of months during the previous year, and an average of 116 or 132 pages is now being maintained. An effort is being made to broaden the scope of the magazine to include articles of special interest to employees without in any way detracting from articles which appeal to department heads and executives.

The reports of the committee on publicity which have been presented from time to time cover this matter very fully, but in view of the fact that it represents such a large portion of the association's activity at the present time, it is worthy of special mention.

The association received a request from the Joint Commission on Agricultural Inquiry of the United States Congress to furnish information covering the connection of electric railways, both city and interurban, with the transportation of agricultural products. As originally presented, the scope of this inquiry was quite voluminous and covered a very comprehensive survey of the electric railway industry, including a complete analysis of the physical property of electric railways, their operating and financial statistics, and all legal and franchise regulations, federal, state and municipal.

The scope of the inquiry was, in fact, much more comprehensive than that of the special electric railway census of the federal Department of Commerce which is made each five years, and it was estimated an expense of over \$200,000 would be involved in carrying it out. The matter was referred to the committee on national relations and Mr. Henry, chairman of the committee, and your executive secretary, called upon representatives of the commission, and after going over the matter with them and presenting the various reports that have been prepared previously by the association, as well as by the federal government covering this matter in a general way, it was possible materially to reduce the request of the commission. In fact, the information already existing in the association files was found to be sufficient when supplemented by a fairly limited questionnaire which was sent to ten of the principal interurban companies.

In addition to this, general statements were prepared by Mr. Henry and by the executive secretary covering the connection of interurban railways with transportation as related to agriculture. It developed that the chief interest of this inquiry is in connection with the steam railroads rather than city or interurban railways.

Many Committees Meet

THE Indianapolis meeting of the association was made this year the occasion for holding a number of committee meetings. These included meetings of several important American Association committees, as well as those of the Engineering and Transportation & Traffic Associations. The meetings were held during the two days preceding the Midyear Meeting or on the day following it. They were well attended.

Brief reports of the meetings held are given below.

VALUATION

A meeting of the valuation committee of the American Association was held at the Claypool Hotel, Indianapolis, on Monday at 3 p.m.

The principal discussion was as to the exact program of work for the committee to undertake in the preparation of its report for the year. After a complete analysis of the field and the most desirable studies to be made, it was decided to concentrate the work of the committee on a thorough study of the so-called "yard-stick" method of valuation. It was proposed to obtain, analyze and portray, as far as possible, valuations made in this manner as compared to those made by detailed inventory to show the dependability of the "yard-stick" method of valuation. Tentative plans were made to obtain the necessary information upon which to make this study.

It was brought out at the committee meeting that it was not so much a question, always, of convincing commissions and companies of the desirability of this method of valuation as it was of educating the courts up to accepting this sort of valuation as competent testimony in valuation cases.

In the absence of Chairman J. P. Barnes, J. H. Hanna presided. Others present were: W. H. Maltbie, Martin Schreiber, A. W. Brady, C. R. Harte, A. S. Richey and Frank H. Miller, for J. P. Barnes.

The committee decided to recommend to Chairman Barnes that he call the next meeting for early in April.

SAFETY WORK

The committee on safety work made some real progress in its meeting toward arriving at a practicable way of selling the gospel of safety to railway heads. A committee of three was appointed to draw up plans for safety work as applicable to four typical properties. The members of this committee are C. B. Scott, F. M. Rosseland and C. L. Van Aucken. The first organization would be one such as would be required to put in force a complete safety organization on a very large electric railway property. A second would outline the procedure and methods to be followed for starting a less extensive work on a smaller railway. For smaller, isolated companies a third scheme would be given in considerable detail, while the fourth would show the

managers of the smaller railways what safety methods can accomplish.

It was brought out that the chief difficulty in promoting the safety idea was that so many railway heads consider this phase of their work an inconsequential portion of their duty. For this reason many, even when convinced of the value of safety work, have not a definite idea of how to undertake this work.

With these four typical recommendations it was thought that the movement could be given the greatest impetus and railway men the most immediate benefit. The material will include the fundamentals of the necessary organization and cite cases of companies already practising safety methods. It will also present a large amount of material which can be adapted to suit the conditions of any particular railway.

The discussion also brought out that a relation exists between fire hazards and safety and it was suggested that much help on the question of reducing this hazard can be extended to railway men, many of whom are not aware of the savings that can be made in insurance rates, as well as decreased expenditures resulting from the correction of dangerous practices. In this work the committee is taking steps to cooperate with the National Safety Council.

CONVENTION LOCATION

This committee met in the Palm Room of the Claypool at 10 a.m. on Monday, with John J. Stanley in the chair. Mr. Stanley first asked for a vote on whether there should be exhibits this year, and this was answered in the affirmative. The question of location was then considered. The advantages of Chicago were set forth by H. J. Kenfield in the absence of Mr. Budd. Mr. Kenfield declared that the new municipal pier was an ideal place for the exhibit, containing room for exhibits more than twice the area required at previous conventions, so that the exhibits could be arranged along one side of the pier. There are also rooms suitable for meetings. The pier is within a half-mile of the Drake Hotel and also is easily reached from the downtown hotels, and its use for convention week could be secured on reasonable terms from the city. Mr. Welsh then read an invitation from the Chamber of Commerce of Chicago, urging the association to select that city. Clinton E. Morgan, of Brooklyn, then reported on Atlantic City as a meeting place and said that his sub-committee, representing the Eastern members of the committee on committee location, recommended Atlantic City for the convention.

A vote then followed, and it was decided to recommend Chicago for the convention, provided satisfactory arrangements could be made for the pier and agreements as to charges with the hotels. This decision was later reported

to the executive committee by Mr. Stanley.

NATIONAL RELATIONS

Chairman C. L. Henry of the committee on national relations called a meeting of that committee in his office on Monday afternoon. At this meeting he called the attention of the members to several bills now before Congress. After a discussion as to the extent to which these bills, if passed, might affect electric railways, the meeting adjourned.

JOINT SESSION OF THE TRACKLESS TRANSPORTATION COMMITTEE

There was a joint meeting of the American, Engineering and T. & T. committees on trackless transportation at the Claypool Hotel at Indianapolis on Feb. 26. The purpose was for the two subordinate committees to report progress on their assignments from the main committee. Those present were Chairman H. B. Flowers, Baltimore; Samuel W. Greenland, Fort Wayne, Ind.; H. B. Potter, Boston; W. J. Flickinger, New Haven; H. A. Mullett, Milwaukee; and R. E. Danforth, Newark, of the American Association committee. The members of the Engineering Association's committee present were Chairman Martin Schreiber, Camden, N. J.; J. M. Bozenbury, Peoria, Ill.; and H. H. Clark, New York.

The T. & T. committee was represented by Chairman C. D. Porter, Hampton, Va.; J. L. Adams, Norristown Pa.; and J. E. Harvell, Richmond, Va.

After a reading of the minutes of the previous meeting of the American Association committee outlining its report for the year and how the two other committees were to co-operate, Chairman Schreiber of the Engineering Association presented a tentative draft of specifications for a bus chassis and body. This had been drawn by sub-committees of his committee and was presented to show that they were at work and thinking as to the details assigned them for study. Mr. Schreiber raised the question that they had been asked to report only on buses with seating capacities of twenty-one, twenty-five or twenty-nine and costing from \$6,000 to \$7,000, and asked for permission to include a design that could be built for \$2,500 with a capacity of seventeen passengers on longitudinal seats. Chairman Flowers commented on his experience and said that the small capacity bus was too costly to operate but that there was nothing to prevent the committee from considering this smaller type, the reason it had not been included in the instructions being that no one had suggested such a type when the instructions were drafted.

The chassis specifications suggested three designs with a floor height of not more than 26 in. with 34 in. solid or semi-pneumatic tires, a frame of maximum depth of section and riveted steel brackets to the side frames for supporting the body. The wheelbases suggested for the twenty-one, twenty-five and twenty-nine passenger bodies were 156 in., 176 in. and 176 in. re-

spectively. Engine capacity was suggested as 30, 40 and 50 hp. respectively at 1,300 r.p.m. with gear ratio of not less than 7:1 and not more than 12:1. The brakes were considered as being all important and the tentative specification called for propeller shaft service brakes with braking surfaces varying from 150 sq.in. for the twenty-one-passenger bus to 200 sq.in. for the larger capacity.

The tentative body specifications provide for straight side construction, a 30-in. service door, with two steps, side post centers coincident with seat centers, curved corner front windows and a rear emergency door.

No tentative report was available on trolley bus operation. The T. & T. committee was not ready to report as it had not yet held a meeting. An informal organization meeting was held on Feb. 27 and plans made for holding a regular meeting in Baltimore about March 15.

COMPANY AND ASSOCIATE MEMBERSHIP

The committee on company and associate membership met at the Claypool Hotel, Indianapolis, on Feb. 27. Chairman F. R. Coates, presiding, stated that

**WE ARE
MEMBERS**



ARE YOU?

CARD FOR OFFICE DISPLAY

sponsors responsible for promoting enrollments as company and associate members had been appointed by him in accordance with plans previously adopted. He believed the details of the promotion work could well be left to the initiative of these sponsors, aided by special pamphlets and other printed matter to be prepared and supplied by the association. The committee decided that some plan should be adopted making announcement, as for example on the floor of the convention, of new members of the association. *ELECTRIC RAILWAY JOURNAL* offered to contribute several of its advertising pages for a series of advertisements promoting the membership campaign. It was understood that *Electric Traction* would contribute in the same way. Another idea suggested was to provide individual members with an embossing seal for imprinting the association emblem on their stationery.

The committee laid plans for a special campaign for new members to be conducted during the forty-five days following March 15. The details of this will be announced by the secretary. Each railway company member is to be requested to display in its purchasing office the sign reproduced herewith.

This is in three colors on an 8 x 10-in. card and supplied to the members.

The meeting was attended by Chairman Coates, M. B. Lambert, L. E. Gould, Secretary Welsh, President Todd, Labert St. Clair, E. F. Wickwire, W. H. Sawyer and L. W. Seeligsberg for H. H. Norris. The next meeting will probably be held in Mansfield, Ohio, in April.

CO-OPERATION WITH STATE ASSOCIATIONS

A meeting of the committee on co-operation with state associations on Feb. 2, at Indianapolis, was attended by Chairman W. H. Sawyer, R. V. Prather, W. V. Hill, Harry Reid and Secretary Welsh. The general policy of reorganizing the personnel of this committee to comprise the permanent executive secretaries of the state associations was determined upon, subject to approval of President Todd. It was felt that the men actively devoting all their time to the association work would be able to make more effective use of the exchange of information planned than railway executives would be likely to. It is planned to have a complete interchange among all committee members of all material got out for their memberships.

ENGINEERING EXECUTIVE COMMITTEE

A luncheon meeting of the executive committee of the Engineering Association was held Sunday, Feb. 26, at the Claypool Hotel, Indianapolis.

In discussion of the efforts to start an American Committee on Heavy Electric Traction, it was brought out that practically all other associations approached have agreed to co-operate with the A.E.R.E.A. The executive committee decided to appoint the usual heavy traction committee and to have the president, in conference with the chairman of the committee, choose members from the committee to represent this association on the joint committee. It was also decided to have this association take the initiative, through its president, by calling the first meeting in the very near future.

Progress reports were made from various sub-committees in co-operation with the American Engineering Standards Committee on the subjects of unification of specifications of wood ties, wires and cables and high-tension crossing specifications. On the last-named subject C. R. Harte presented four questions which had been raised and the answers which it had been proposed this association make, and these were approved.

A communication from the American Society of Mechanical Engineers was read requesting that this association appoint representatives on a joint committee on nuts, bolts and rivets. The president was authorized to do so.

A suggested standardization of shafting keys, in which the key for a given size of shaft would be standardized, was received from the American Society of Mechanical Engineers requesting indorsement or comment. It was decided to refer this by mail to the members of the equipment commit-

tee and the standards committee for criticism, the result to be informally communicated to the American Society of Mechanical Engineers.

Question having been raised several times in the past to the method of adopting standards by the association, this matter was referred to the reorganization committee which is being formed now.

It was decided, after considerable discussion, to include in the engineering manual an abstract of pages 57 to 62 of the report of the 1921 committee on wood preservation, adjoining the wood preservation section.

In order to provide for the most effective presentation and discussion of papers at the annual convention, it was proposed that a set of rules be formulated as to time limits, etc., in this respect. Secretary Welsh was instructed to formulate such a set of rules, for instance similar to those used by the American Institute of Electrical Engineers, and report at a later meeting of the executive committee.

The committee approved the education committee taking over the work of the apprentice system committee.

With reference to the proposal that a standard nomenclature of engineering and mechanical employees be worked out, the committee decided to let that matter lay over till next year.

The president was authorized to appoint a representative to attend the National Fire Protection Association meeting, such representative to be chosen from the company nearest the location of the meeting.

It was brought out that the new A.S.M.E. Boiler Code, now including non-fired pressure containers, affects, or may affect, the air tanks of cars. Appointment of a representative of the association was authorized to confer with the Boiler Code committee on this point.

The committee authorized the secretary to continue his activities in presenting the request of the Engineering Association to the American Association that past-presidents' badges be authorized and furnished. Some samples were discussed.

In the absence of President Kimball, First Vice-President L. C. Datz presided. Others present were: Daniel Durie, Charles Clark, C. R. Harte, H. A. Johnson, A. B. Stitzer, Secretary J. W. Welsh and Special Engineer G. C. Hecker.

POWER GENERATION

The power generation committee at this meeting took steps toward the prevention of duplication in its work by that of similar committees of other national engineering organizations interested in electric power production. It was decided that permission should be sought from the committees of the Edison Association and the National Electric Light Association to have a representative attend their meetings and thus work on a co-operative, rather than a duplicating basis. For the reason that not all railways are interested

in power generation and because of the work already done by those associations more intimately connected with this problem, it was not thought advisable to attempt the compilation of a comprehensive power generation report.

On the question of electrolysis it was impossible to draw a line definitely separating the work of the sub-committees on power generation and distribution committee. For this reason it was decided that but one report should be submitted. However, these committees would work independently and would prepare separate reports which later

would be correlated and united into one complete report. A motion was passed assigning to the chairmen of the four sub-committees on electrolysis the duty of gathering data on these particular phases of the problem. They were then authorized to work with the distribution committee to compile the results, taking into account both generation and distribution problems.

Those in attendance were E. H. Scofield, chairman; A. B. Stitzer, G. W. Saathoff, W. E. Bryan, L. D. Bale, G. H. Roosevelt, and T. H. Hayes for F. C. Hanker.

Report of Committee on Policy*

THE payment of expenses of committee members by the American Association was discontinued by the executive committee in December, 1918. This action was taken primarily because the amount of money involved had been steadily increasing and represented too great a burden upon the association's resources. It was further believed that the payment of these expenses as carried on at that time did not represent an equitable arrangement, as the custom was not a universal one; some companies continued to pay the expenses of their officers and employees while others submitted the bill to the association.

The principal argument for the payment of these expenses by the association has been that the work of the committee is for the benefit of the industry at large, therefore the cost should be distributed over the entire association. In addition to this, it has been argued that it permits a freer selection of men, since none need refuse on the score of the cost of attending committee meetings. This argument has been especially advanced in the case of certain companies, which either owing to their geographical location or because of their financial condition were unable to defray the expenses of their representatives.

The above point of view, while worthy of consideration, does not, in the opinion of the committee on policy, cover the situation, as it fails to take into account the benefit which accrues to the individual committeeman as well as his company as a result of his participation in this work. In other words, a man by serving on a committee, in the first place, has an opportunity for broadening his knowledge and becoming a stronger and more capable officer of a company. In the second place, the special knowledge frequently acquired by committeemen as a result of their investigations has, in a number of cases, been of direct benefit to their employing companies. For example, a member of one of the engineering committees last year as a result of his committee work learned of certain developments which resulted in the saving of approximately \$20,000 to his company.

*Submitted to and approved by the executive committee of the American Electric Railway Association at Indianapolis, Ind., Feb. 27, 1922.

This was a matter which would not have readily come out in the committee's report, and even had it thus appeared it would have been too late to save the company the cost in this case, as it had already started an expensive construction which he was able to discontinue as a result.

Membership on association committees is in complete harmony with the policy which many companies have of encouraging their officers in belonging to the local Chambers of Commerce, Rotary Clubs and other civic organizations where they have an opportunity of taking part in community affairs for the development of mutual understanding between the company and the public. In the case of association committee work the opportunity is presented for interchange of views and policies as between companies.

So far as the actual effect on the attendance at committee meetings is concerned, the experience of the Engineering Association last year, from records in the secretary's office, show that the average attendance was 77 per cent of the theoretical full attendance. In view of the fact that the membership on committees has been distributed geographically throughout the country and certain members of committees accept appointment with the understanding that they will conduct their work by correspondence, it does not appear that this question has had a serious effect on committee work.

A recent computation of the actual cost of the bare traveling expenses alone, including only railroad and Pullman fare, for all members of the committees of the various associations for a year developed that this would amount to approximately \$40,000. It, therefore, seems hardly justifiable as a sound financial policy at the present time for the association to undertake to assume so great an addition to its normal expenses, representing more than 25 per cent of the income from dues.

In view of this, the committee on policy suggests that the attention of member companies be directed to the considerations set forth in this brief review of existing conditions and that so far as possible member companies lend their support to committee work by defraying the expenses of their representatives.

Trackless Transportation and the Electric Railway

Consider Service Essentials, First and Always, Was the Burden of the Symposium of Papers Presented at the Indianapolis Meeting of the American Electric Railway Association and Dealing with the General Theme of Transportation Co-ordination

THE morning session of the Mid-year Meeting was largely occupied with a discussion of the place of trackless transportation in the field now largely occupied by the electric railway. The speakers scheduled to prepare opening remarks on the subject were E. B. Whitman, member Maryland Public Service Commission, Baltimore; C. D. Emmons, president United Railways & Electric Company, Baltimore, Md.; Harry Reid, president Interstate Public Service Company, Indianapolis, Ind., and Paul Shoup, president Pacific Electric Railway, San Francisco, Cal. Abstracts of the papers in this symposium follow:

How the Maryland Commission Acts*

Transportation in a Community Is a Natural Service Monopoly—Commission Believes in Co-ordination of All Services

By Ezra B. Whitman

Member Public Service Commission of Maryland

IT PROBABLY is not necessary for me to argue before you gentlemen that urban transportation is a natural monopoly, and that the public will be served best where the transportation needs of the particular city or community are met by a unified system. In Baltimore, my native city, the evolution of the transportation industry has been the same as that of the other older cities of the country. First we had the stage coaches, next the horse cars, then the cable cars, and still later the electric cars. The present trolley system of Baltimore represents the consolidation of sixty-three different companies. A number of these companies were being operated by the same interests at the time of the final consolidation in 1899.

In the early days of the electric lines, competition for traffic and jockeying for franchises led to over-extension of many of the lines, and some of these lines, after the lapse of twenty-five years, are not yet self-sustaining.

The consolidated company, the United Railways & Electric Company

of Baltimore, had an absolute monopoly of the transportation business of the city until the advent of the jitney bus, in 1915. The first jitney bus to make its appearance on the streets of Baltimore was operated by a woman, and was placed in service in February, 1915. Before six months had elapsed certain streets leading into the heart of the business section were literally over-run with jitneys.

The pioneers of this field of transportation had no knowledge of the requirements of the business in which they were engaged. In the main the owner of the bus was also the operator, and he made no effort, and probably was unable, to determine whether he was operating at a profit. The operator knew that he was taking in more cash, in the way of fares, than he was expending for gasoline, garage hire and other current costs of operation, and drew the natural, though erroneous, conclusion that the difference between the income and the outgo represented the return to him for his services and his investment, and promptly spent it.

Alas, when the tires of his bus were worn out, he found that he had no money left from his operations with which to replace them. The first of the year rolled around, and he had to borrow money to pay for his automobile license for the new year. If he happened to be able to weather these minor difficulties, his real trouble came when his bus had to be replaced. It was then that he realized that something, he knew not what, was wrong with his accounting and financial systems. In all likelihood, he had never heard the word "depreciation," or the term "depreciation reserve," and he had no conception of their meaning. He either dropped out, or borrowed money with which to buy a new bus.

Aside from a few scattered buses operating in various sections of the city, the operations of the jitneys were confined to one line with a number of buses, on Charles Street, the main north and south street of the city, and to a number of individual buses on Fayette Street, one of the principal east and west streets. The street railway company, fighting fire with fire, or rather buses with buses, started a competing line on Charles Street, and when the independent line had been forced to retire from the field, the company likewise sought permission to discontinue its service. This permission the commission has refused to give, al-

though according to figures submitted by the company the line has always been operated at a loss.

The Fayette Street line of independent buses continues to operate, the commission restricting the number of buses on this route to thirty-three. There is always a waiting list of applicants who are anxious to secure permits for this route. I might say in passing that the service furnished by some of these individual operators is so poor that if a large corporation attempted to give the same grade of service our commission would undoubtedly receive strong and numerous protests from the people who use these buses with vigorous demands for improvement of the service. While the commission is giving these lines the closest supervision permitted by its limited force and is endeavoring to require the operators to maintain their operating schedules, it finds it almost impossible to prevent the individual operators from discontinuing their trips when business is slack, resuming operations when traffic is brisk. In other words, some of these operators desire to take only the "cream" of the traffic during the peak periods and are not concerned with their duty to the public of furnishing safe and adequate service at all times and hours.

COMMISSION BELIEVES IN MONOPOLY

The Public Service Commission of Maryland was given jurisdiction over jitney buses by an act of the General Assembly in 1914, but the mushroom growth of the jitneys in 1915 clearly demonstrated that if the commission was to exercise an effective control over this form of transportation it must be given more direct and summary power to enforce its rules and regulations. The result was that in 1916 the General Assembly enacted an amendment to the act requiring the owners of motor vehicles engaged in the public transportation of persons and property over fixed routes and on regular schedules to obtain permits for such operation from the commission, and also gave the commission the power to prescribe and enforce rules for the operation of such vehicles.

Until within the past year, the attitude of the local street railway company, as well as of various other established transportation companies in the state, was first that of *laissez faire*, the companies probably believing that the ruinous competition between the buses

*Text of paper read at eleventh Mid-year Meeting of American Electric Railway Association, Indianapolis, Ind., Feb. 28, 1922.

and the lack of proper management and application of business principles would soon result in the failure of all those engaged in this new form of transportation, and that the monopolies previously enjoyed by the several railway companies would be restored.

The Maryland Commission is convinced that the transportation needs of any city can be served best by permitting one company to maintain a monopoly. Many railway companies seem to have jumped to the conclusion that the motor bus has no place in the transportation system of a city, and consequently have failed to make the necessary studies to determine just how buses can be used to advantage, as supplementary to or extensions of the existing electric railway systems. The bus has been used with success in Europe for a number of years, and that it has a legitimate place in urban transportation in America is the sincere conviction of the writer and his associates on the Maryland Commission. The problem is that of determining its place and then keeping it in its place.

The railway companies now are coming to realize that their original policy of "hands off" was ill-advised, and that they must recognize the motor bus as a real, and probably permanent, competitor. In Baltimore the Fayette Street buses are collecting about \$600 per day, and practically every dollar of this money is a dollar lost to the street railway company. We find the president of one of the largest and most substantial railroads of the country complaining of the competition of the motor trucks and buses, particularly on the branch lines. How much better it would have been if the railroad operators had met the situation squarely when it first arose and had had the vision to plan for the future, using the motor vehicles as auxiliaries and feeders to the rail lines instead of allowing them to become competitors.

GROWING SECTIONS ENTITLED TO TRANSPORTATION

Two years ago the limits of Baltimore City were extended, so that at the present time the area of the city is three times as great as it was before annexation. There are a number of suburban electric railway lines running through the territory of the new annex, but at the same time there are a number of growing sections which are without means of transportation. These sections would develop much more rapidly if there were adequate facilities for transportation, and property values would increase, to the immediate benefit of the property owners. The city and State would share in this increment, by reason of additional taxes upon the higher assessed valuation.

That the people of these growing sections are entitled to some means of transportation practically is conceded by all concerned. In some instances motor vehicle operators are willing to furnish service of a kind provided they are permitted to bring their passengers

into the center of the city. This permission the commission is not inclined to grant, for several reasons. It would result in a paralleling of the lines of the railway company, sometimes for several miles through a sparsely settled suburban community, and would also result in increasing still further the congestion in the downtown section.

It also has been the experience of the commission that while such lines, in order to gain access to the city, are willing to agree that they will not solicit or handle local passengers, they soon forget the agreement and are not averse to augmenting their revenues by picking up local passengers. At the same time, the commission must secure service where it is required, and if the railway company cannot or will not furnish such service, the independent bus lines must be permitted to operate.

Feeling that the transportation requirements of Baltimore and the territory adjacent thereto can best be met by the present street railway company, the problem which faces the Maryland Commission and the company is that of determining the means by which the service where needed shall be supplied and on what terms the extensions shall be made. The real estate developers, knowing that as soon as transportation facilities are provided they can sell by the front foot land which they have purchased by the acre, are insistent that the commission require the company to make extensions into the sections where their holdings lie, and the scattered pioneer householders in these sections indorse the demands of the real estate developers. Their contention is that means of transportation must of necessity precede real estate development. They overlook entirely the fact that until such time as the line proves self-sustaining, it constitutes a burden upon the rest of the system, and that the deficits from its operation, in the natural course of events, must be borne by the car riders in the built-up section of the territory served. This burden takes either the form of higher fares or poorer service.

Some years ago the commission ordered the Baltimore company to extend one of its lines. The commission found that if a single-track line were constructed and a minimum service furnished, the extension could be operated at a small profit. The company contended that if it were to build a line into this territory, in the judgment of the management, it should build a double-track line, and that if a double-track line were built, service could not be furnished at a profit. Upon appeal, the courts sustained the contention of the company and restrained the commission from enforcing its order requiring the extension.

The Federal Electric Railways Commission in its report to the President of the United States said:

Your commission would urge that in every community, where and to such extent as may be practicable, consideration be given to the advisability of requiring extensions and rapid transit systems of subway and elevated to be paid for, not out of new

COMPARISON OF INVESTMENT AND OPERATING EXPENSES TRACKLESS TROLLEY

Investment:	
Six miles overhead construction at \$5,000 per mile.....	\$30,000
Three buses at \$10,000 each.....	30,000
	\$60,000
Annual costs—	
Fixed charges:	
Interest \$60,000 at 8 per cent.....	\$4,800
Depreciation on overhead—5 per cent on \$30,000.....	1,500
Depreciation on buses—15 per cent on \$30,000.....	4,500
	\$10,800
Operating costs:	
312 bus-miles per day at 22 cents per bus-mile = \$68.64	
68.64 x 360.....	\$24,600
	\$35,400

BUSES

Investment:	
Three buses at \$6,000.....	\$18,000
Annual costs—	
Fixed charges:	
Interest—8 per cent on \$18,000.....	\$1,440
Depreciation—15 per cent on \$18,000.....	2,700
	\$4,140
Operating costs:	
312 bus-miles per day at 35 cents per bus-mile = \$109.20	
109.20 x 360.....	\$39,300
	\$43,440

SINGLE LINE ELECTRIC RAILWAY

Investment:	
Six miles track and overhead at \$35,000 per mile.....	\$210,000
Three one-man cars at \$6,000.....	18,000
	\$228,000
Annual costs—	
Fixed charges:	
Interest—8 per cent on \$228,000.....	\$17,240
Depreciation—5 per cent on \$228,000.....	11,400
	\$28,640
Operating costs:	
312 car-miles per day at 20 cents per car-mile = \$62.40	
62.40 x 360.....	\$22,450
	\$51,090

capital invested through the medium of bonds or stock, which means for all time an added burden upon the car rider, but from special taxes assessed against the owners of property in the district the value of which is enhanced by such extensions.

This would not be a new principle; it would be merely the application of an old principle. The American property owner has been accustomed to contribute out of the increase in value of his property to the cost of building streets and other public improvements. The principle is peculiarly applicable to improvements of city transportation systems, because of the enormous increases in real estate values created when new extensions open up new territory or when the creation of rapid transit facilities make outlying territory more available.

Since 1909 New York City has had authority, under an amendment to the rapid transit act, to construct rapid transit railroads and to assess upon the property benefited the cost of such construction, in whole or in part. The authority granted by the law, however, has never been invoked, so far as the writer has been able to ascertain.

The private ownership of the Baltimore company has made impracticable the use of the assessment plan, although it doubtless could be accomplished if the city, county and state governments were to agree upon the necessary legislation and have such legislation enacted into law. The principle of assessment upon property benefited is very familiar in Baltimore, this plan being followed in paying for the cost of opening streets, changing grades of streets, etc. After the great fire of 1904, a considerable portion of the cost of the improvements in the "burnt district" was met by assessment upon the properties benefited.

Several months ago the residents and the owners of property along one of the main highways leading to the city sought the aid of the commission in securing for them transportation service to and from the city. A survey of the situation developed that it would not be feasible at this time to construct a line of railway to serve this section, due to the high cost of track construction and the comparatively small amount of traffic which would offer.

The commission and the railway company then turned to a study of the possibility of using either motor buses or trackless trolleys to take care of the needs of the community in question, and it was determined that the trackless trolley would best serve the purpose. The accompanying figures show the approximate capital investment, the fixed charges and the operating expenses for a trackless trolley, bus line and single track electric railway line for serving the territory under consideration. These figures are based upon such costs as were available to the commission and are probably sufficiently correct for purposes of comparison.

The commission suggested to those interested in securing transportation in the community under consideration that they confer with the officials of the railway company. As a result of this conference the railway company submitted a proposal to the officials of the improvement association of the neighborhood, calling for the property owners to guarantee the entire operating expenses, depreciation and interest charges, so that the company would not be subjected to any possible loss in the operation of the new lines. As a counter-proposal, the representatives of the improvement association suggested that they buy \$10,000 worth of tickets a year from the railway company, thereby guaranteeing at least a revenue of \$10,000.

Not being able to reach an agreement, the improvement association carried on negotiations with one of the best managed bus lines in the State of Maryland, and this bus line agreed to run buses over this route, provided the commission would permit the buses to run parallel to the street car lines to the center of the city. Not being willing to grant this permission, the commission finally called together all the interested persons and pointed out to the railway officials that inasmuch as they have been granted a monopoly of the transportation system, there were certain obligations which the railway company should meet in the way of furnishing necessary transportation. It was also pointed out to the property owners that they would largely benefit by the installation of the transportation line, and if they had faith in the development of their section that they should be willing to assume responsibility for at least a large part of the losses of the railway company during the development years.

As a result of this conference, it was finally agreed that the improvement association would endeavor to raise

sufficient funds to guarantee the railway company against losses up to \$10,000 for the first year, \$7,500 for the second year and \$5,000 a year for the next succeeding three years. If the traffic develops so that there would be no losses, then this money will be refunded to those who put it up as a guarantee, while, if the losses are greater than the amounts above stated, the street railway company will stand such losses. This agreement was approved by the improvement association and a considerable portion of the money was raised at the first meeting where this plan was submitted, and it is hoped that the entire funds necessary for the guarantee will be raised within the next few weeks.

This arrangement commends itself to the commission as being eminently fair, and may be used in other cases where there is a demand for transportation service. In point of fact, there are at this time at least twelve other localities in Baltimore where transportation is desired.

It is the belief of the writer that in every community the public will be best

served by a co-ordinated service and a unified system in which the electric trolley line, the trackless trolley and the bus will each serve a useful place in the field of transportation. It is believed that it is a great mistake for the street railway companies to refuse to give service and to permit a part of the transportation facilities to be furnished by outside interests, which at all times are potential competitors even though they start in such a way that there is no competition. We also feel that the established transportation system is in a position to give better service than any possible independent operator, and it is our belief that not only will the urban transportation systems in the future be compelled to utilize trackless methods of transportation to supplement the existing electric railway lines, but we also believe that throughout the rural districts the railroad companies will find that their interests can best be served by establishing feeder lines of buses rather than to allow the bus transportation to fall into the hands of those who will establish competing lines.

City Service and British Conditions*

By C. D. Emmons

President United Railways & Electric Company of Baltimore

Development of City Transportation in America—Observations on British Tramway Conditions and the Place of the Bus, Based on a Trip Last Summer

THE history of transportation in any large city will be, to a large extent, the history in all others. In Baltimore, which in 1854 had a population of approximately 175,000 people, a transportation system of horse-drawn omnibuses had gradually developed. With wages of only 10 cents to 15 cents per hour, a fare of 5 cents was charged. It was not until May, 1859, that work was



C. D. EMMONS

begun on installing car tracks. Then the early idea that electric power would result in exceedingly low operating costs not only caused a rapid change of the then horse and cable roads into electric lines but prompted the building of additional parallel and competitive lines. Today nearly every American city has more trackage than is warranted by its population.

Not long after the general movement toward the consolidation of city service systems and their rearrangement to give the maximum service to the rider at the least cost, conditions were further disturbed by the advent of the

jitney craze in the year 1915. The experiences of Bridgeport, Toledo and Des Moines are recent enough to be fixed firmly in the minds of the entire country, yet there are still many sections that have not as yet taken any active steps to conserve for their citizens a co-ordination of the transportation facilities, such as will in the end make for the best transportation for the least money—a

result, I am sure, all fair-minded citizens, as well as the operators of city service, are anxious to attain.

TRANSPORTATION METHODS IN LONDON

Having heard a great deal about the possibility of the motor bus finally supplanting the street railway systems of our cities, and with the often repeated statement that it is being done in London and other English cities, the writer, accompanied by the vice-president of his company, made a trip to the British Isles during last summer. Instead of the buses supplanting the street railway, we found a firm conviction in the minds of the English people that proper city service could not be given at a minimum fare unless the entire

*Abstract of paper presented at eleventh Midyear Meeting of American Electric Railway Association, Indianapolis, Ind., Feb. 28, 1922.

service of the city is co-ordinated under one agency, whether this agency is a private company, as in London, or a municipality, as in Birmingham, Liverpool, Glasgow, Edinburgh and other places visited.

When one first reaches London and is driven through the streets in a taxicab to his hotel, he is forcibly struck by the absence of street railway track in what is known as "Old London," which is the name applied to the present financial district of the town, about 1 mile square, and with a day population of approximately 400,000, and with a night population of about 20,000.

A short study of "Old London," with its very crooked, narrow, never parallel and ever dead-ending streets, soon convinces one of the impossibility of street railway tracks in that district. The only way to have a tramway in this section is underground. The underground railway system of London is very extensive, and under the guidance of our eminent ex-member, Lord Ashfield—formerly familiarly known to us as "Al" Stanley and now chairman and managing director of the London Electric Railways and Associated Companies—an excellent and satisfactory service has been developed.

Being a firm believer in the co-ordination under one management of all transportation facilities, with a wide degree of public regulation of such management, Lord Ashfield has succeeded in consolidating ten different underground and tramway companies with the London General Omnibus Company, operating in Old and Greater London. He has even gone so far as to secure a co-ordination of transportation facilities through the arrangement of the London General Omnibus Company for through bookings with the London County Council Tramways at the tramway dead ends in the various communities. This co-operation is noteworthy for the reason that for years the London General Omnibus Company and the London County Tramways (a municipal undertaking) have been bitter competitors.

Further, as a means to better the service to the public, the advisory committee of the Ministry of Transport, in its special regulations for buses, provides that buses may not be hailed at any point, but must have four definitely marked regular stops and two optional stopping places in each mile of route. This total of six stops a mile compares with our total of ten to fifteen stops a mile and helps greatly in the average speed per hour of their buses.

It has been often said that the traffic of London is handled by the bus service. A visit to Old London and the observance of the enormous morning and evening rush to and from the underground railways will soon dispel this idea as well as that of the possibility of any bus service in the narrow London streets being able to cope with the problem of the mass transportation in the rush hours.

During the normal hours of the day

the buses are very popular, and it is not surprising that when the figures of the entire traffic of Greater London are put together, it is found that the buses carry approximately 30 per cent of the total, while the underground and suburban railways carry about 40 per cent, and the tramways about 30 per cent. The consolidation of the buses with the underground has permitted very economical dispatching to conform to weather conditions. On rainy weekdays the traffic on the buses falls off approximately 25 per cent as compared with a good day, and on a rainy Sunday it is barely 50 per cent of a good Sunday. Fewer buses and more subway trains are, therefore, run in bad weather, and vice versa.

BRITISH FARES AND PRACTICES

The charge for the rides in London, as well as in all other places throughout the British Isles, is based on the zone system, wherein a minimum fare of from 1d. (2 cents) to 2d. (4 cents) will permit a ride (varying in different localities) of from one-half to 1 mile, with increasing rates for longer distances. The short rides may be cheap, as is often declared in America, but one taking long rides, such as is possible in any of our American cities, and as were taken by us in London, must pay as much as 48 cents, though in New York a ride for the same distance would cost 5 cents, and in other places from 7 to 10 cents. To take care of the increased cost of operation, the minimum fare for the shortest ride, which had formerly been 1d., or 2 cents, has been raised 50 per cent to 1½d., or 3 cents. This 50 per cent increase caused a falling off of short-haul traffic of only 4 per cent.

In London is the largest development of bus operation in the world. There are approximately 3,000 buses carrying close to one billion passengers each year on about 150 different routes. We were, however, very much impressed with the fact that the London buses themselves do not compare, either in looks or in riding qualities, with the late types of buses used in this country.

In Birmingham, Liverpool, Glasgow, Edinburgh, York, Leeds, Bradford, Sheffield, Nottingham and other cities, we found the city tramway systems owned and operated by the municipalities themselves, and in every one of these places, with the exception of Edinburgh, experience had taught that to give proper service to the people at a minimum cost, it was impossible to permit real competition of buses with the tramways. Where such competition had actually been started in any of these cities, the competing companies had finally been purchased and the cities were so operating these bus lines that they were an auxiliary or an extension service instead of a competitive service.

In cities such as Birmingham, where outside bus lines were permitted to enter and operate in the city, an extra high initial fare has to be charged on the buses where they overlap the tram-

way in the center of the city, in order to prevent competition with the tramway service and reserve the buses for long-distance travel.

We were greatly impressed by the serious lack of progress shown in the development and standardization of the city tramways. For example, track gages range from 3 ft. to 4 ft. 8½ in. Our American cities, however, are not free from this criticism.

The cars are largely single-truck double-deck cars which have been in use in the English cities for the last twenty years, most of the managers priding themselves on strictly adhering to a standard. This attitude in our country would be very quickly put down as non-progressive. We saw in the British Isles absolutely no modern cars such as our present prepayment cars, the Peter Witt or center-entrance trail cars, or one-man type of cars.

Again we were impressed with the small amount of trackage in the various cities, which shows, in comparison with an American city, a great lack of service to their people. For instance: In Birmingham, a town of 900,000 inhabitants, there are only 130 miles of single track, or about 1 mile to every 7,000 people. Liverpool, a city of 800,000, has only 120 miles of track, or 1 mile to every 6,600 people. This same ratio prevails throughout the cities of England. In our American cities, the ratio apparently runs from 1 mile to approximately every 1,500 people up to 1 mile to every 2,500 people. In Baltimore we have 1 mile to every 1,800 people.

NUMBER OF REVENUE PASSENGERS PER MILE IS HIGH

This lack of mileage in the British Isles causes a very highly saturated riding condition, so that their revenue passengers per car-mile will run from fourteen to sixteen, while in our American cities we have from about five to eight revenue passengers per car-mile.

On account of the double-deck single-truck cars, the apparent speed is very low, but because of the long distances between stops, they are able to make an average speed of approximately 8 m.p.h.

One feature that greatly impressed us was that even with the open platform and steep and winding stairway of the double-deck car, producing great liability to accident, the accident ratio in most of the cities is very low. Apparently the ambulance-chasing lawyer and the malingering claimant have not as yet developed in such numbers in England as we have them in America.

The English people are very patient and easily submit to the necessary time and trouble taken to collect and check up the zone fares. They are also most patient and readily co-operate in carrying out the system of queue loading.

The operating costs, as given us by the various managers, are interesting, but differ to such an extent that we feel they are not altogether comparable. For instance, in Birmingham, we were told of an operating expense per car-mile for the tramcars of 38.88 cents

and for the buses of 45.18 cents. In Liverpool the figures for tramcar operation were 47.82 cents and in Glasgow 43.22 cents. Again in Edinburgh, we were given the figures: 30.806 cents for electric operation, 41.804 cents for cable operation and 39.26 cents for bus operation. In York, we were given 35.58 cents for electric operation and 23.06 cents for trackless trolley operation. In Leeds the costs were 34.40 cents for electric operation and 28.50 cents for trackless trolley operation. In Sheffield they were 35.96 cents for electric operation and 46.54 cents for gasoline bus operation.

In conversation with James Dalrymple, general manager Glasgow Municipal Tramways, who is the outstanding figure in tramway operation in Great Britain, we asked him if he had any reason to change the statement he made in America some years ago to the effect that he thought it would be inadvisable for American cities to operate their transportation systems themselves. He stated that he had been quite convinced, after a careful study at that time, that it was not advisable, and he said he has found no reason to cause him to change his mind concerning the desirability of private ownership and operation in American cities.

In England operators are not at all agreed among themselves as to the best method of handling city transportation.

H. E. Blain, managing director London General Omnibus Company, is now, always has been, and likely always will be, convinced that the gasoline bus is the best method, but he admitted that it was necessary to have a subway system, or some other such system, to take care of the mass transportation of the morning and evening rush-hours. Mr. Dalrymple is a standpatter for the use of the tramways. As yet he has no buses or other forms of transportation in Glasgow, although he admits it is likely he will install some bus lines in the future to avoid the heavy cost of present-day construction of tramway extensions.

Mr. Pilcher, general manager Edinburgh Corporation Tramways, is now using buses to supplement car service.

In York, they are using a trackless trolley for the purpose of augmenting their present service.

In Leeds, in places where good roads are available, Mr. Hamilton is using gasoline buses for his lightest traffic and the trackless trolley for medium traffic, but he feels that the tramway must be the backbone of the transportation system.

Mr. Wilkinson, general manager Bradford Corporation Tramways, is a strong advocate of the trackless trolley, and feels that this is the only method to supplement and augment his tramway service, which must bear the main burden of the transportation service.

Curiously, at Sheffield, the very next city we visited after Bradford—and quite adjacent to Bradford—Mr. Fearnley, general manager Sheffield Corporation Tramways, is just as strong an advocate of the gasoline bus as Mr.

Wilkinson of Bradford is of the trackless trolley. Sheffield, with its population of 500,000 people, has only 79 miles of track, or only 1 mile to every 6,300 people, so that Mr. Fearnley has quite an opportunity to supplement his tramway service with other forms of transportation.

In a paper presented at the conference of the Municipal Tramways Association in 1919, Mr. Fearnley expressed himself as follows:

1. The gasoline motor bus is an excellent vehicle in acting as a feeder to tramway routes.
2. The gasoline motor bus is an unsuitable vehicle for satisfactory dealing with heavy town traffic.
3. The gasoline motor bus is quite inadequate for dealing with Sheffield peak loads.
4. The gasoline motor bus is financially impossible at tramway rates of fare.

5. The gasoline motor bus has no advantage over tramways in regard to average speed maintained during the day.

If nothing else, the result of our trip emphasized in our minds the following outstanding facts:

1. The English transportation systems, with the exception of the London Underground and the London General Omnibus Company, were very much out of date, and we came back to America with the idea that the English people could learn very much from a visit to us.

2. Predominantly, it is the outstanding conclusion of the citizens of the various cities visited that, to obtain the best service for its people at a minimum cost, there is only room for one transportation system in any one city, whether operated by a private company or by the municipality itself.

3. That in American cities, a complete, comprehensive and satisfactory transportation system, at a minimum cost, can be secured only by means of the control of all city transportation agencies in the hands of one management.

Auto Bus and Truck Good as Interurban Feeders*

By Harry Reid

President Indianapolis & Louisville Traction Railway, Indianapolis, Ind.

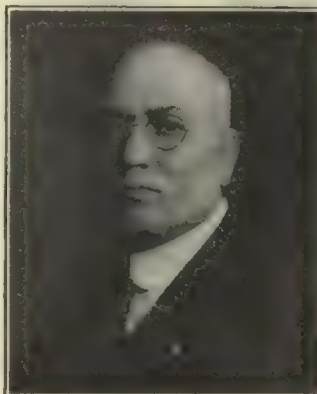
The Author's Interurban Railway Is Arranging for Joint Tariff Rates with Bus and Auto Truck Lines—Considers Them Desirable When They Act as Feeders

PROBABLY many of you know that I am opposed to the motor bus and the freight handling truck as competitors of the electric interurban railway and feel their business should be regulated on the same principle that two gas, two electric or two water companies are not allowed to compete, unless they did so before regulation was provided. I believe that our interurban business, to be successful, must also operate as a natural monopoly. In Pennsylvania, for example, no bus or truck line can operate in competition with an interurban railway unless it first obtains a certificate of convenience and necessity from the Public Service Commission.

I am, of course, a friend of trackless transportation where it promises to become the forerunner of an interurban line.

If trackless transportation is established, its charges should be regulated by proper authority so that no injustice may be done to public, interurban railway or truck. In addition to this regulation, the bus or truck should pay a special license tax, not only as a compensation for the damage done to the roads which the interurban helped to build, but also as an off-set to special tax burdens placed upon the interurban industry.

I have said that these transportation agencies should be eliminated as a com-



HARRY REID

petitor of the interurban. On the other hand, I can readily see how they might be of great assistance as cross-country feeders to our lines. As a matter of fact, the company which I represent is arranging with certain motor bus and freight truck lines operating cross-country to our lines for joint tariffs naming rates and points reached by the interurban and truck or bus lines

which both the Interstate Commerce Commission and the Public Service Commission have indicated their willingness to accept, provided the company furnishing the tariffs assumes the responsibility for shipments over the entire route. This can be accomplished by bonding the truck or bus line when each joint tariff is filed, so that the company filing the tariffs would be protected fully.

A large amount of high-class tonnage can be created for the interurban and a service can be rendered to the rural districts which will prove of mutual benefit to the interurban company and the inhabitants served. This policy will also tend largely more rapidly to develop the outlying territory. A development of this nature will establish an outlet for farm products from interior points, located on truck lines, to town and city markets which heretofore have been inaccessible. In turn, such a policy will make it possible for interior points to get their supplies with less effort and smaller expense and

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operate toward the general development of these rural territories, opening up new fields of industry, which, due to lack of transportation facilities, have been wholly inactive.

Live stock is being transported to a very considerable extent by the several interurban companies entering Indianapolis. The motor truck may be useful as a feeder to the interurbans in bringing live stock from the farm to the nearest interurban point, and this prac-

tice would also be true of dairy products, garden truck and fruits.

The co-ordination of trackless transportation with the future service of the electric interurban means a more thoroughgoing development of the territory served and for a much wider scope than has heretofore been possible, but only under conditions, such as I have outlined, can I see any benefit to be derived by our industry from the trackless transportation business.

California Situation Regarding Rail and Trackless Transportation*

By Paul Shoup

President the Pacific Electric Railway, Los Angeles, Cal.

**Intensive Competitive Development Has Produced Acute Condition—
California Railways Protest Free Use of Roads by Bus
Carriers—A Small Number of Supplementary
Services Recognized as Legitimate**

OUR experience in California so far has been chiefly one of competition and not of co-ordination, eliminating the trackless trolley system, which as yet has no place in our service. It is true that a trackless trolley operated in the Hollywood section as a feeder to the Pacific Electric for several years, the service being discontinued because it was unprofitable some ten years ago.

Dealing first with the question of trackless trolley, the studies so far made by us indicate that it should be approached only from the viewpoint of temporary use as a connection of the track service and that the construction of overhead and rolling stock should be with the end in view that ultimately the tracks may be extended to supplant the trackless service. A second essential condition is that the streets over which such trackless service is given be paved, and the third, that the franchises be of a nature that will place only light obligations upon the operating company. The failure of the Hollywood trackless trolley, which was quite thoroughly investigated by us at the time, was very largely due to the fact that the roads were not paved. Not only was power consumption large but the maintenance cost was excessive.

The tremendous cost of roadbed, track and paving under the present requirements of municipalities in our section is such as to make very desirable an escape from the use of rails if practicable. There is, however, a growing inclination on the part of the cities to realize that the paving burdens, aside



PAUL SHOUP

from the question of roadbeds now imposed upon the electric railways, are not wholly proper obligations of these railways. The State Legislature of California at its last session recognized this fact by amending the law so that it is no longer mandatory on counties and municipalities to require the paving of streets for the space occupied and two feet outside thereof on either side by the electric railways. Since that time we have taken but one franchise, this replacing existing franchises in the city of Fresno, and Fresno has relieved us in connection with new construction from paving or from renewal of paving though not of roadbeds underneath.

It requires from \$90,000 to \$143,000 per double track mile to construct an electric railway in California under the varying requirements of the municipalities and obviously traffic has to be quite dense in order to earn an interest return and depreciation upon such costs. Pioneering can not be undertaken unless a large part of the cost is paid by the community directly benefited. The conclusion is therefore a logical one that pioneering without rails is the desirable form on streets under the conditions as they now exist and it may very well be that trackless transportation will find a very considerable field in that direction.

The important development in connection with trackless transportation in California has not been, however, one of co-ordination, but one of competition. The motor bus and the motor truck are the serious elements in this situation and not the trackless trolley. Indeed it is probable that the motor bus and motor truck have been developed as

fully in California in proportion to the traffic as anywhere in the United States. This is due to a number of facts: first, that they can operate throughout the year with facility; second, that California in proportion to population has more paved streets and highways than any other section of the United States and, third, that an extensive development in California has made for a dense suburban and rural population in many sections. A minor factor has been that there are a number of sections isolated from railroads where the motor bus and motor truck have succeeded to the operations of the stage coach and the freight wagon, this being particularly true in the mountain regions and in some sections of the oil fields.

In considering the motor bus or motor truck either in co-operation or in competition with the electric railways, and for that matter the steam railways also, we must have in mind that they are now enjoying advantages which may very well disappear in large degree and it will not be at all safe to make investments upon the basis of present relations between these carriers and the public.

At this time the motor buses and the motor trucks have a very great advantage over the railways in California, whether electric or steam. The state, counties and municipalities have provided them not only with rights of way but with paved roadbeds at an expense of over \$100,000,000. But the motor buses and motor trucks do not have to contribute to this capital investment. The state license fees for operation are, compared with the taxation of the electric railways, very light indeed. Out of every dollar taken in by the electric railways 5½ cents is turned over to the state aside from local franchise taxes. Less than 10 per cent of the counties and municipalities as yet make any license charge against the motor carriers. Indeed, the paving paid for by the electric railways in the various cities is used by the motor carriers without any charge.

To repeat the statement made to me the other day by one of the most prominent newspaper owners, "The state is running its steam and electric transportation systems by providing parallel lines of transportation free to operators who have no other investment than in the vehicles they use and is at the same time increasing the taxes of these railways in order that these highways may be maintained and extended. Our highways were designed for private use, but with the situation as it now is the private use by the several hundred thousand automobiles and other motor carriers of private ownership is being rapidly subordinated to the use of these highways as common carriers. The ultimate result unless the situation is changed will be disastrous to everybody." The gentleman I quote is very largely interested in many sections of California and has had made for his own information a study of the situation.

How public sentiment is changing is

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shown by the fact that ten counties acting individually and seven counties acting through the San Joaquin Valley Supervisors Association have passed resolutions through their Boards of Supervisors urging the Railroad Commission not to grant any additional permits to motor carriers where they compete with the rail carriers, pointing out that they are not paying proper compensation for the use of the highways. Many Chambers of Commerce and other commercial bodies have taken similar action. Seventy-seven newspapers of the state have commented upon the destruction of the highways through their use as public utilities without proper compensation and the injustice done to the electric railways and the steam lines as well through this condition, which must ultimately react unfavorably upon the welfare of the State as a whole. The Railroad Commission has been making a thorough study of this subject, the power resting with it to grant or withhold permits for new operations, and it has found it desirable recently to turn down a great many more such applications than it has approved.

At this time it is costing to build highways in the State of California \$50,000 per mile if they are to be of a nature to stand up under the heavier motor carrier traffic, and \$30,000 per mile if these heavier weighted vehicles with loads be eliminated. The figures are those of the State Highway Commission, which has taken action repeatedly to call the attention of the people of the state to the fact that it is impossible to maintain the highways under present appropriations and that the situation must become worse and worse as the years go on if these conditions are not changed.

The far-seeing men in the automotive industry are realizing that you cannot "have your cake and eat it too." They know that the highways must be maintained or their industry must disintegrate with the highways. They are very much more concerned with the successful operation of the several hundred thousand privately-owned machines than they are with the relatively few number of motor carriers used as public utilities. There is among the owners of the private machines a feeling growing stronger and stronger against the highways being turned into roadbeds for public utility uses.

The conviction is becoming more general also that at the best the users of the highways are going to have to contribute in the way of license taxes much larger amounts than they have heretofore if these highways are to be maintained in a serviceable condition. They do not want this condition accentuated by any unnecessary public utility use or any public utility use that is not paid for properly. In other words, there is a feeling that all public carriers in their relations to the public should bear the same burdens in proportion to the service rendered in the way of taxation irrespective of the form the transportation takes.

Public sentiment is headed toward the

conclusion that the state or any subdivision thereof should not on one hand contribute any more in the way of facilities to the passenger who moves by motor bus than it should to the passenger who moves by rail and on the other hand that the tax taken from the revenue derived by the carriers should be on the same basis in both cases.

Nowhere in California have any of the communities willingly given up electric railway service even where the motor bus has been most fully developed. Neither are they satisfied with the reduction in the steam railway service that has followed the establishment of these motor bus lines. In Fresno, where probably there are as many automobiles in proportion to the population as anywhere in the country and where there is a very large inter-urban bus service, the people are strongly opposed to any curtailment of the electric service in the city but instead are very insistent upon extensions of the lines and are dealing with the situation accordingly. Los Angeles by a strong majority in a referendum vote discontinued the service of jitneys in the downtown business section, which immediately eliminated all such service. Oakland, San José, Sacramento, San Diego, Stockton, Fresno, Bakersfield and some of the smaller cities, all at one time or another have had the "jitney fever" and have all recovered, there being no such service now in these cities except a very few lines serving sections isolated from the car lines. In San Francisco the jitney fare has been changed to 10 cents, and during the busy hours the buses are not permitted on an important section of the major business street.

We do not know just how prosperous the motor bus and motor truck industry is in California for the reason that as yet the figures furnished the State Railroad Commission are hardly comprehensive. There are about 800 individuals and companies operating under its jurisdiction at this time. Their investment is very small in comparison with their operating revenues, which for 1921 probably reached \$20,000,000. The earnings of the principal companies for 1921 are not available, but the returns for 1920 show very small earnings and in the case of the two largest companies a deficit. If they paid taxes, maintenance charges and had to bear some fair proportion of the carrying charges on the investment in the roadbed used, the number that could continue operation would no doubt be very limited. Yet in the end it is altogether probable that they must submit to this business measure.

It is true that there are isolated communities having no railway service and which need and must have a motor bus and motor truck service. This condition it will be necessary to consider in the making of new laws.

We who are in the electric railway service have had occasion to study very seriously the accident problem and when we come to consider adding the motor carrier service to our present

form of transportation we find that feature to be one of very great interest. During the first nine months of 1921 the principal motor carrier in California had 345 accidents and either directly or through the insurance company that was carrying its insurance during that year it had to pay out a very large sum of money. As the highways become more and more crowded with vehicles the difficulty of maintaining schedules and not having accidents becomes greater and greater.

Therefore when we consider the extension on any very considerable scale the trackless carriers as auxiliary to or successor to our present operations we find many reasons why we should proceed with great caution. Summarizing these are: First, the assurance of increased taxation either locally or by the state to the point where such carriers will be placed on a parity with railroads because of the absolute need of the public for more money to maintain its highways and the drying up of other sources of revenue for this purpose; second, the feeling on the part of the automobile using public that the highways are designed for private use and are not to be made over into roadbeds for public utility service endeavoring to maintain certain schedules, which almost necessitates their having the right of way; third, the growing belief of the public that the railway which it finds to be essential, steam or electric, should not be destroyed or deteriorated by a competition which divides existing business through the paralleling of lines and does not except in a limited way create new traffic.

The fact has become recognized that the public must eventually pay for the support of two forms of transportation, one of which may be made inefficient by the other without the newer form being able to give a satisfactory service. Coupled with this is the feeling that fair play demands equality of treatment as among carriers; and fourth, the fact that at the present time with burdens as light as they are the earnings of the motor buses have not been particularly profitable, and with other problems and increased use of the highways, more regulation and more taxation the prospect for the investor can not be said to be very alluring.

In California the electric railways have found the motor bus and the motor trucks a competitive form of transportation, taking advantage of our highway system, and very destructive to the electric railway interests, which as you know have had a hard enough time to survive the competition of the privately operated automobile and the great increase in the burden of their expenses. It is impossible for these electric railways with their experience, none being immune, to feel that the motor bus and motor truck transportation should be classed with them or that the suggestion should be entertained that the two be co-ordinated, since such co-ordination is absolutely

impossible under existing conditions. Every electric railway in California has suffered severely from this competition. Each one has had to make its battle against the unfair features of such competition.

It is true to say that the cities generally, with perhaps only two exceptions, in the whole State, have concluded that in so far as city service is concerned they want the electric railways and they do not want the jitneys and so far as the two exceptions are concerned if it were possible to justify the extension of the street railway systems I believe they would be very glad indeed to dispense with the other service. A number of the roads under my jurisdiction have used motor buses as auxiliaries and to some extent we are doing that now, though in the

northern cities the results were so unsatisfactory that we have discontinued their use. In connection with the Pacific Electric we are enlarging upon our experiments to give such auxiliary service a fair trial. But it is idle to talk of a community of interest between the motor bus companies and the electric railways.

In closing, I am asked to express one strong unanimous view of the electric railways of California. They have had a very bitter and costly experience in dealing with the competition of the motor buses subsidized through the use of highway systems of the state and its subdivisions. They strongly differentiate between the electric railways, which furnish all their own facilities, and the motor carriers, which furnish nothing but vehicles. They protest as

with one voice in attempting to associate the interests of the two. This expression I know is not the result of our electric railway managements naturally having any different viewpoints from those that would be entertained by those elsewhere, but as a result of an experience that has been bitter and disastrous to the interests that they represent. Co-ordination between the companies of the one kind and the other under conditions that now exist cannot be brought about. In legislative questions, in the establishment of new laws, in the maintenance of parallel lines, in the existing inequality of treatment, the conflict is too bitter. Our views are not governed by any theory as to what should be, but by the hard facts that each day affect the bread and butter of our lines.

How the Manufacturers of Electric Railway Supplies Can Help the Industry*

By E. F. Wickwire

Secretary Ohio Brass Company, Mansfield, Ohio
Chairman Committee on Co-operation of Manufacturers

By Education of Employees of Manufacturing Companies to See Their Relation to the Success of the Electric Railways Much Good Public Education Will Result—Examples of What Some Manufacturers Are Doing

I HAVE been asked to submit to you this morning a brief report regarding the plans and activities of the committee on co-operation of manufacturers.

Most of the manufacturers who have heard of the work outlined by this committee seems to feel that it is a very excellent idea and they want to help carry it out. But when you pin them down, they don't seem to understand quite how to go about it, and many of them are afraid to ask.

I want to say right here, however, that those who have fully grasped the idea are doing most excellent work, which is very encouraging, and clearly indicates that the plan can be carried out successfully when properly organized and directed.

Your committee made up their minds in the beginning that they didn't want to follow up a theory that wouldn't work. But we've gone far enough to become satisfied that our theory will work, just as fast as it is really understood by the manufacturers. It has been said that a man is as big as the unit in which he thinks. It's time that we manufacturers of electric railway materials began to think in bigger units.

We should not think of our transactions with the electric railways as finished when we box up the goods ready for delivery—as the undertaker looks upon a corpse—he can't help his cus-

tomers any more. But we should not overlook the fact that the electric railway is a public utility, which has been subjected to regulation, intimidation and strangulation, until in some places it is in danger of extermination; and we can help our customer, the electric railway, to remedy this trouble, if we will only make the effort, along the lines that your committee is suggesting.

But we must be careful about selecting the right remedy, and we must also administer it properly, or we'll spoil the effect. This is illustrated by the story of Casey and his friend Flannigan, who was very sick. Casey volunteered to sit up all night with him. The doctor instructed Casey to administer a certain powder every hour, starting at 10 o'clock, and to give him just what he could get on a dime and no more. He took a dime from his pocket and showed Casey the necessary portion and cautioned him against an overdose. The next morning when the doctor called he found Flannigan dead. He said to Casey, "Did you give him the dose I prescribed?" Casey said, "Of course I did, but I didn't have a dime, so I put it on two nickels."

Now, broadly speaking, what's the best way to help remedy the electric railway situation? I think Mr. Maxwell, in a talk which he gave in Cleveland the other day, came close to the mark when he said:

"To the extent that the public understands the underlying facts and principles of the utility industry and the conditions under which they render

service, to that extent will equity and justice prevail in the public's regulation of its utilities."

But how are we going to get the public to understand? Why, by educating them. And can you think of a better way to help than by intelligent co-operation of the manufacturers with the electric railways, than by the pyramiding of their influence along well-directed publicity and educational lines?

I say well directed, because we should be sure that we understand the problem and how it should be worked out.

We should study this problem carefully and handle it right.

Now here is our theory—our plan to help solve the problem—briefly summarized:

If the manufacturers, whose prosperity is linked with the prosperity of the electric railways, carried the true story of the public utilities to the thousands in their own organizations, to their influential sources of supply, to their stockholders and to their public representatives, a tremendous energy would be put to work to get a square deal for the electric railways.

There may have been a time when many public utilities turned their backs on public opinion, but that time has passed. Public utilities are now courting public opinion, and we manufacturers are most certainly in a position to exert a strong influence to help win it.

We can help teach the public that transportation always has been and always will be a vital factor in the life

*Abstract of report of special committee on the co-operation of manufacturers presented at the Midyear Meeting of the American Electric Railway Association, Indianapolis, Ind., Feb. 28, 1922.

and growth of this country, and of every community, and that it is entitled to their fair consideration and support.

I would like to take just a minute to draw your attention to a few concrete examples, indicating the ready response that your committee is getting from some manufacturers in connection with this work.

Here's a letter from an official of a large manufacturing company, addressed to this committee:

"DEAR MR. WICKWIRE: Attached find copy of my letter addressed to our local newspapers. The 'copy' that I sent to them was sent to us by the association.

"If agreeable to you, I would like to have your suggestions at any time until I get this matter thoroughly in mind and I will welcome any letters from you that may help, not only in our own publications here in the factory but in our local newspapers. Fortunately, we are in a position to receive their co-operation."

The man who wrote this letter is a "live wire." I know him. He's so energetic that if he had the "seven-year itch" he'd scratch it out in five. His concern employs something like 3,000 men. He's going to be a big help to us in this work.

THIS SHOWS WHAT CAN BE DONE WITH A LITTLE CO-OPERATION

Here's a little folder which was recently sent out by one of the large manufacturing companies to its stockholders. I'll read the last three paragraphs:

"The electric railway in your city may be large or small; it may be prosperous or in financial difficulties, but it is a part of a most essential industry. You may or may not have occasion to patronize the local line as a passenger, but in any case you realize how necessary it is as a community builder, as an element for increasing property values, as a means of transportation of the masses. What would your city have been without the street railway? What would happen to it if tomorrow all street railway service were permanently abolished?

"Thus, your co-operation in securing a constructively favorable public attitude of mind toward the electric railways in your community will not only result in better service for the people and in aiding the prosperity of your neighborhood but will also benefit you as a part of this organization."

This concern not only wants its stockholders to have faith in its business but knowledge regarding the electric railway industry, from which it secures a large part of its business.

Here's a little incident of a manufacturer of electric railway materials who writes that he found right in his own plant a foreman who was one of the most active agitators in town against the local traction company.

Of course a little reasoning with that foreman showed him where he was wrong. He simply hadn't realized that

he was acting directly against his own interests. He was like one of those fellows whose mind becomes so intent upon injuring the man with the Twin Six that he neglects his own six twins.

Here's a manufacturer who writes that he put one of our educational articles into his factory publication and found that it aroused a good deal of interest.

But there was a fly in the ointment, because he discovered that some employees got the idea that he was trying to "whitewash" the local street railway service and that they must not complain regardless of what happened.

To offset this impression, he emphasized to his employees the fact that

Mr. Wickwire said:

If the manufacturers, whose prosperity is linked with the prosperity of the electric railways, carried the true story of the public utilities (1) to the thousands in their own organizations, (2) to their influential sources of supply, (3) to their stockholders, and (4) to their public representatives, a tremendous energy would be put to work to get a square deal for the electric railways.

today the wise railway manager welcomes legitimate complaints and constructive criticisms, as against destructive demands on the part of the public.

And here's a manager of a railway and lighting property who became interested in this question of manufacturers' co-operation and writes that a little observation caused him to find in one day two salesmen who stepped out of buses and walked into his office to solicit business. Of course they did it unthinkingly, because the buses happened to come along at the right minute.

But it was very easy for the manager to show them the error of their way, and they promised to live better lives.

Here is a quotation from the company house organ of another electric railway manufacturer:

"Some will say that street car companies do not give 100 per cent service. In some cases this is probably true. It is usually found that the management is trying to improve conditions and will welcome constructive criticism. But don't forget that putting cars in car-houses and substituting buses will not bring about the desired results.

"We of the company have an especial interest in this problem. We should see that the street car companies get a square deal. Almost everything we make goes to the public utilities—much of it to the street railways. If a railway goes out of business, we sell less material and there is less work in the factory.

"The welfare of each one of us is largely dependent upon the welfare of the street railways, don't forget that. When you hear some one say that the street car company should be put out of business it is up to you to defend your 'bread and butter.'"

All the examples that I have cited are excellent efforts along the right lines, and we can all find plenty of such opportunities if we will only observe, reflect and apply. But your committee feels that we should have a better organized, more concerted and properly directed working arrangement.

With that end in view, President Todd recently sent out a letter to all manufacturing company members of this association, briefly outlining the plans of this committee, asking for the co-operation of each manufacturer and for the name of the proper man in each concern to follow up the work in that organization.

The plan is that the home office of this association will shortly commence to send each manufacturer carefully prepared ammunition for use by the manufacturer in carrying on this work and we want this data to reach the man in each manufacturing organization who is in best position to use it to advantage.

It is gratifying to be able to say that the responses to President Todd's letter have already exceeded our expectations, but we want an answer from every manufacturing company member. So if you have not sent in your reply, please do so right away.

Recently the headquarters organization of this association has been short-handed and too rushed to follow up this work as vigorously as it desired. But we are glad to report that the "decks have now been cleared for real action." Yesterday the executive committee indorsed a plan to arrange to have Labert St. Clair give special attention to the direction of the work outlined.

DON'T WASTE THE AMMUNITION

Mr. St. Clair is well known to all of us for his successes in public relation work. We certainly want to give him our hearty support, and not waste the "ammunition" he sends us, but "shoot it straight at the mark."

And, above all, please don't get the idea, or let your organizations get the idea, that your individual efforts will be too small to carry any weight in this movement. No effort is too small to count; it all helps. In short, it's the combined effect of all these seemingly small efforts that will get the big result we're after.

Like the small boy who had the flock of bantam chickens. They weren't laying very well, and the eggs were not large enough to suit the boy. So one day he had a bright idea. He got an ostrich egg, hung it up in the barn and lined up all the bantams where they could see it. "There," he said, "keep your eyes on that, and do your best."

That's all we ask you manufacturers to do—keep your eyes on the "Big Idea," and do your best.

"First Aid" on Chicago Elevated Railroads*

By Britton I. Budd

President Chicago Elevated Railroads

A First-Aid Team Comprising Twenty Employees from All Branches of the Property Has Accomplished Wonders as a Part of a Comprehensive Plan for Interesting All of the Employees in Promptly Attending to Injuries of Even Minor Character

AN IMPORTANT feature of safety-first work in modern industry, which has not generally been given the attention it deserves, is "first aid." Practice of first-aid methods in an organization not only tends to reduce the number of accidents, through the education of the employees to the danger of carelessness, but when an accident does occur it minimizes the effects, lessens the period of incapacitation and sometimes results in saving human life.

On the Chicago Elevated Railroads, safety first and first aid have gone hand in hand since 1913. In that year we began, through our medical department, to place containers with necessary surgical and medical supplies in convenient locations for immediate use in case of accident. A five-man drill team was organized on the Metropolitan West Side Elevated Railway to aid the medical department in giving group lectures to the various classes of employees.

FOLLOW-UP SYSTEM ESSENTIAL TO SUCCESS

From this comparatively small beginning, a complete system of first-aid work was developed. From experience we learned that if the work was to be really effective, it would have to be organized and a system of discipline instituted to insure the proper maintenance of the equipment. A new style of first-aid box was procured, with a compact form of container and filled with supplies which experience had shown to be most essential in the treatment of injuries common to our employees.

These boxes are installed at convenient points along our lines, designated by a distinctive marker, to acquaint our employees with the location of the first-aid stations, where medical and surgical supplies are at all times available in an emergency. With each first-aid box, a United States Army folding stretcher and a woolen blanket were placed, also posters showing the Schaeffer prone method of resuscitation from electrical shock. The number of such stations was gradually increased, until at present we have 135 first-aid stations on the Elevated System.

To insure that these first-aid boxes are constantly provided with supplies, a plan of systematic inspection was



BRITTON I. BUDD

worked out by the medical department and a check made of the weekly reports sent in by the men in charge of the individual boxes. A record is made and kept in each box of the name of the person treated, and the nature and extent of the injury for which the contents of the box had been used.

The next step was to organize and train the employees at the first-aid stations in the intelligent use of the medical and surgical supplies. Under the guidance of a physician from the medical department, this instruction was given to group classes of twenty employees. It included practical demonstrations, covering such subjects as resuscitation from electrical shock, application of splints to fractures, control of hemorrhage and proper dressing of burns and lacerations. As accidents

frequently occur at places where a doctor is not immediately available, properly instructed first-aid men in many such cases are able to alleviate suffering and save life.

FIRST-AID TEAM OF REPRESENTATIVE COMPOSITION ORGANIZED

To extend this work and make it more efficient, the Chicago Elevated Railroads First Aid Team was organized. It is composed of twenty employees from all branches, selected by the heads of the several departments. In selecting this team consideration was given to personal appearance, length of service with the company, youthfulness and ability to assimilate the lessons in first-aid work and impart the instructions to others. Men interested in the work from a humanitarian point of view were given preference. These men, on being selected, attended a school of first aid, held in two-hour sessions twice a week, for a period of thirty hours.

In the instruction of the men the use of medical terms was avoided and the lessons were given in the simplest language possible. On completion of their course of instruction, the men were examined by the American Red Cross and each one was awarded a certificate. To supplement the class training, each man was brought into the medical department individually and spent one day in getting first-hand practical knowledge of the work.

The team has been organized for



FIRST-AID TEAM AND EQUIPMENT. THIS TEAM DEMONSTRATED ITS METHODS AT THE MIDYEAR MEETING

*Abstract of paper presented at eleventh Midyear Meeting of American Electric Railway Association, Indianapolis, Ind., Feb. 28, 1922, preliminary to demonstration by Chicago Elevated Railroads' First Aid Team.



CHICAGO ELEVATED RAILROADS' FIRST-AID TEAM AT PRACTICE DRILL

five months. The men meet once a week, perfecting their drill work and increasing their knowledge. They have made a number of public appearances and are in demand in Chicago.

While the main purpose of the first-aid team is to render assistance in emergency, the members perform other valuable work among their fellow em-

ployees. They attend group meetings and instruct the rank and file. Members of the team take charge of the inspections of first-aid boxes. They make sanitary inspections and aid the examining physicians in making medical surveys of employees. The team has developed a number of men who are competent lecturers on first aid.

The results obtained from the organization of the first-aid team have been well worth while. Fatalities due to electrical shock have been eliminated, infections have been reduced to a point where it is rarely necessary to bring minor injuries to the attention of the medical department, and employees have been encouraged to give attention to seemingly trivial injuries, thereby avoiding serious complications. Two members of the team have been awarded medals for actually saving life, and two others have won medals in competition in first-aid work.

It is difficult to estimate the effect which the organization of the first-aid team has had on the morale of the employees. It has stimulated interest in the safety-first movement and in health measures of every kind. The men know that at any time of the day or night there is at least one man available to render intelligent assistance in an emergency until a doctor arrives.

Unfair Tax Burdens*

By Fielder Sanders

Formerly Street Railway Commissioner, Cleveland, Ohio

**The Car Rider Pays the Tax, Either Directly with Service-at-Cost or by Poorer Service with a Fixed Fare
—If This Is Understood Taxes Will Be Lower—Electric Railway Men Must
Take More Practical Interest in Politics**

ALL the peculiar imposts placed upon the street railways, from the park tax of Baltimore, the car license taxes, the mill tax and the pavement tax, down to the ludicrous tax paid for the maintenance of crossing cops, result directly from the way taxes are originated. They are levied in the same way by statesmen of large and statesmen of small degree, of all classes from township trustees to United States Senators. I might almost say that one favorite amusement of our public officials for many years has been to devise ways to raise money to spend. Most of the devices adopted are planned to be painless to the voters, whether so in fact or not. The result is that they are assessed against those who object least, or as someone feelingly said, "those who do not squawk." Street railway men are usually content to talk and to write to each other about the injustices of their taxes, but usually do not make their talk heard. The car riders usually know nothing about it. Nobody tells them. Farmers are heard, real estate operators, banks, municipalities holler, bondholders always, mercantile establishments, surely; but not electric railway riders or operators.

Theoretically, the public utilities should pay no taxes of any kind. It is hard, almost impossible, to draw a line



FIELDER SANDERS

of distinction between light, heat, water, drainage, pavement and street railway transportation as a facility of the free movement of men and goods. If the people have some of them at cost, or at least with taxation eliminated, why not the others, especially since the public opinion now is that the utilities should be operated at cost, including as a part of the cost a fair return on the money invested, and no more? But curiously enough, taxation remains as a part of the cost. We may hope that some day the light, now apparent to some few, will shine upon all our legislators and the exemption of all utilities from all taxation become a thing of being. It might not be amiss, while we are hoping, to do a little work along these

lines. Utilities as well as individuals are saved not only by faith and hope, but by works.

TAXES ARE PAID BY CONSUMERS

That these unfair taxation burdens are paid by the car riders is too axiomatic to discuss, yet, from my own experience of six years as a public official in your particular line, I have found it the hardest single thing to drive home to the public. The car riders' ignorance is not surprising, when you consider that they have been given the opposite slant for many years past. Yet the fact is simply that in service-at-cost franchises, taxation is a direct charge as a part of the rate of fare. In the companies whose rates of fare are regulated by public commissions, it is reflected a little more indirectly. In those unfortunate companies which are bound by a fixed rate of fare, the tax burdens are reflected in poorer accommodations and worse service to the public. So the car riders bear a part, if not all, of the burdens of this taxation. It is our task to make them know it, and when they realize it you have working for your interest, instead of against you, the selfish pocketbook interests of the millions.

I cannot and would not go into the detail of the many foolish burdens which are laid upon the car riders. Each city has its own. The mere statement of a few of them is enough to demonstrate the inequality. For in-

*Abstract of paper presented at eleventh Midyear Meeting of American Electric Railway Association at Indianapolis, Ind., Feb. 28, 1922.

stance, the park tax, for the maintenance of breathing spaces for the people of Baltimore, of more than a million dollars a year, is paid by the car riders through the United Railways of Baltimore. Has anybody suggested that the automobile owner pay a tax for the upkeep of the parks? Yet in Cleveland, at least, the autoists use the parks more than the car riders. Paving taxes (in 1920) of more than a half million dollars in Philadelphia and Chicago; the great bill for street cleaning in Chicago and Pittsburgh; sprinkling taxes; car license taxes in Baltimore, Philadelphia and Buffalo; bridge tolls, more than one hundred thousand dollars in Pittsburgh; the mill taxes of hundreds of thousands of dollars in St. Louis and Cincinnati are examples. I have heard, however, that the fare got so high in Cincinnati that the public officials had to pass up the mill tax, at least temporarily. Franchise taxes also are a great burden in some states. All of these result in a street railway paying as high as 11.47 per cent of its gross income for taxes. Cleveland in 1921 paid 6.64 per cent, and we think we pay too much.

All these devices are frankly mere revenue producers at the expense of the car rider, and these taxes are as truly paid by the passenger as if, instead of one fare box there were two, one labelled, "for your ride" and the other "for taxes." It might be illuminating and interesting, where the taxation part of the fare is even money, say 1 cent in every 5, 6 or 7 cents, for the company actually to install two fare boxes, one for taxes and the other for the ride. I believe it would have educational value and produce rapid results in changing the viewpoint of the people.

As between the extreme views that the railway and the car rider should pay all taxes that can be assessed against them and that they should pay no taxes, it seems that a middle ground can be reached, i.e., that the passenger should pay only the cost of his transportation. The physical property used for his transportation may well be taxed as other physical property is, but the car rider, if he pays taxes on the value of the conveyance which hauls him, should not then pay taxes for the privilege of being in the conveyance. In Ohio, we believe generally in taxing property only, not the income from property. In New York, there is an opinion that taxes should be levied against net income. Whichever method is followed, the result to be had is that the customer should pay at least no more in proportion than the customer of any other business. Our customers do.

Enough of this recital. The second branch of the subject which has been assigned to me is how these things may be done away with. What can the speaker suggest?

HOW TAXES MAY BE REDUCED

Many practical men to secure a margin between income and outgo have advocated the hardest and most unpopular way, raising the fare; fewer

have proposed a radical reduction of expenses. I think that this association has now come to the point of view that at this time, raising the fare, except where companies are grossly under a reasonable rate, must be abandoned. The other task must be pursued and expenses reduced by the elimination of unnecessary expenses, such as taxation. Until the railways establish themselves as governmental agencies so as to become exempt from taxation, efforts should be made to correct the taxation laws so that they will pay only the usual taxation on their property, such as paid by any of our good citizens.

In Cleveland, our company pays no license, paying tax or bridge tax and none of the privilege or occupational taxes. It is true we pay large corporation taxes to the State of Ohio, but no more than other corporations. Most of our troubles in Cleveland are with high tax valuations, so much so that three separate times the City Council of Cleveland has ordered the railway and myself as commissioner to combat in the courts and otherwise, taxes which in their opinion are unjust. We also pay federal income taxes, which in our case have amounted to great sums of money. This is an unjust burden upon the car-riding public, and Cleveland has directed the company to take all necessary steps to recover that money from the government. Perhaps the next annual convention of this association may have some very interesting views along that line.

One other branch of unjust taxes I should mention. It is the unjust removal of taxes from similar classes of securities. The market is flooded with tax-exempt securities, many of them securities of the same class of industry as railway securities. The result is the railways cannot sell their stock. This is a matter of great public interest to industries of all kinds. The street railways are not alone in this battle. Powerful influences are now moving to correct this evil, including the President of the United States. Every business man in the country should be associated in the effort to relieve this situation.

TAKE MORE INTEREST IN POLITICS

So we are confronted with the question of how the unjust burdens may be removed.

One way is for each utility representing its stockholders and car riders to take a speaking and working part in the great taxation reform movements, which are going on in several states as well as in the United States Government. Again, something can be done in securing a favorable construction of existing tax laws. Employment of expert lawyers and tax experts and their appearance before tribunals may secure in some cases an interpretation of existing laws in the car riders' interest. We are now trying that before the Federal Court as to income tax. But if you find that the interpretation of existing laws is futile, then the real fundamental basis of all unjust taxation of public utilities should be re-

moved by curing the cause. This is primarily the idea that the right to operate a utility is a special privilege to the owner thereof in derogation to the rights of the people and to their damage and should be paid for liberally. Even in educated communities like Cleveland we find people who think so. The people must be told in such a way that they will believe that this is wrong.

How can this be done? Advertising, publicity, etc., help, but in the last analysis public opinion must be changed. How? By getting into politics and mixing in your organization the leaven of the common people. My statement may sound rough to some of our sedate brothers, but I mean that the utilities have always operated at arm's length from the people.

Politics means not only long-distance interest in government (which doesn't count), but neighborhood activity (which does). I don't mean any slush fund, or the doing of the many things of which the people accused the utilities years past. That was wrong. But I mean politics as an officeholder, a politician, understands it—the influencing of people to vote for what is right and demonstrating to the voters that what you want is right. Such politics does not wait until your legislators and governors are elected and then sends skilled lawyers to appear before the committees. The damage is usually done when that time arrives.

The politics I mean is the identifying of yourself and your people and neighbors through neighborly helpfulness with the average man of your neighborhood and your city; taking the part you have a right to take in your improvement associations; voting for your representative on party committees (either party will do); voting for your ward councilman and state legislator. See that your honest neighbors who are reasonable men are chosen. See that they are pledged to the right treatment of yourselves. Make yourself part of the day-to-day life of your town. Have some homely companionship instead of the aloofness which characterizes too many of your organization. Establish a department of politics as a part of your day-to-day work. It is the most important part. Call it a department of public relations, if it sounds better to you. One of your successful men, Samuel Insull, stated most aptly the other day:

I would like to refer to the question of publicity and public relationship. That is a subject which is the manager's job, the president's job, the chairman's job. It is of more consequence to your properties than everything put together.

There has been a great deal of discussion in all the various public utility businesses on this subject for a number of years past. The tendency of a great many of us is to push that matter over to the other fellow; to let one of our subordinates look after it. But there is no more important task. It is important beyond even the raising of capital for the business, because there is no use in raising capital, or trying to, unless the public relationship is with you, and unless you establish such relationship with the public so as to insure the safety of that capital. For involved in the safety of our capital, the development of our business and the permanency of our business, above everything else is the question of public relations.

He is right. The American public is fair. It can be trusted to do the right thing, if it knows what is right. If you can show the car riders of your city what these taxes mean, you can secure back of you the human selfish-

ness of millions of car riders, working for their own interest.

There are signs now evident of increasing fairness in the opinion of the American people of street railways, but not yet does the man in every

other business fully appreciate that he is riding on his own trolleys and the expense is as he make it, but he is coming to that knowledge. When he gets a proper perspective of the matter your difficulties will be over.

As a Commissioner Sees the Issues*

By Hon. J. W. McCardle

Chairman Public Service Commission of Indiana

A Frank Talk on the Basis of Valuations, the Proper Rate of Return, Tax Exempt Securities and Publicity, as They Concern Electric Railway Operation—Keeping the Public Advised Is the Prime Requisite

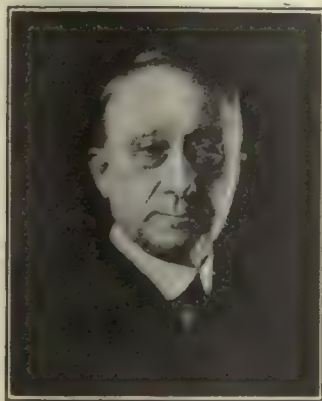
THE Public Service Commission of Indiana is glad to participate in the proceedings of your 1922 Midyear Meeting and to welcome you to Indianapolis, which I imagine was chosen as the meeting place this year as a compliment to your distinguished president, a resident of our State and city.

You gentlemen represent an industry that has suffered tremendously in loss of business prestige, earnings and credit within the past six or seven years. Jitneys, automobiles and soaring costs of operation have all but demoralized your management and paralyzed your physical equipment. I think you have deserved much better luck.

I know very well that while organizations and associations of the character of the American Electric Railway Association are trained to praise regulation as a very necessary institution, individually and privately most of you are inclined to look upon it as a necessary evil to be endured because it cannot be avoided.

Between ourselves, don't you still say to each other that your business is being interfered with by the politicians? And don't you look upon the personnel of regulatory bodies as a lot of greenhorns and upstarts or, to take the most charitable point of view, don't you look upon us merely as a lot of well-meaning but misguided and misinformed office holders? While we are trying to justify an increased rate of return on sound economic principles, have you not your minds still fixed on the forerunner for all the other principles of rate making, namely, the principle that you are entitled to collect all the traffic will bear? I believe you would be something less or something more than human if you were not so constituted.

Out of the war era from which we are still emerging but from the effects of which we will not escape wholly for a great many years to come, there have arisen new problems to engage our most serious attention, to baffle, and in some instances to confound us.



HON. J. W. MCCARDLE

If it takes \$1.50 to buy the same merchandise which before the war cost only \$1.00, the purchaser must be provided with \$1.50 if the merchandise is to be had, and if the purchaser happens to be an electric railway or public utility, the rate payer or passenger must put up the extra 50 cents.

CONDITIONS UNDER WHICH CURRENCY INFLATION CAUSES DISCOMFORT

It is only when the rate payer or rider fails to earn at least \$1.50 in place of the dollar he formerly earned that "inflation" works a hardship. The farmer now is in the position of buying in a market of high prices and selling in a market of low prices. The values of farm products have been paralyzed by the complete disappearance of an export demand for our supplies, and farm products have fallen below even the pre-war level. The fact itself suggests the result. Farmers are seriously embarrassed financially and are complaining bitterly. They make the problems of the Public Service Commissioner extremely difficult so far as these problems touch the farmer's purse.

Within the past year we have heard frequent complaints against the tendency to allow the utility the benefit of increased values that arise from applying higher average unit prices to inventories of physical property in the reproduction method of valuation. Some of the objectors have referred to this increased value as an unearned increment. It is not an unearned increment in the ordinary acceptance of the

term but an increment in name only. It is an increment represented by a larger number of dollars which have the same purchasing power as the lesser number heretofore.

Before the war, regulatory bodies had fairly stable standards and methods of evaluating privately owned property dedicated to public use.

Before the war it made little difference whether we used present prices or the average unit prices of three, five, seven or ten years in our theoretical reproduction of an inventory of physical property. The result was the same because prices were reasonably constant. Present prices or average unit prices for three years, five years, seven years or ten years ending with 1920, however, involve a maximum variable of more than one-half in the two greatest extremes. The year 1921 shows a material recession in prices—copper, for instance, touching a new low level. In the midst of this apparent confusion, there is reliable authority for believing that the new price level—one that will be sustained for many years—will be very much higher than the pre-war price level. There is some authority for believing that it will be 50 per cent higher than the prewar price level. Whether it is 50 per cent, or 40 per cent, or 30 per cent lighter than the prewar price level, regulatory bodies may use average unit prices as much higher than prewar prices as the new level is found to be higher than the old. No one will be injured as a result of this policy. In fact, an injury both to the utility and to the public is likely to ensue unless such a policy shall be adopted.

PUBLIC NEEDS EXPLANATION OF NECESSITY FOR RATE READJUSTMENT

There is a danger at this time, however, of undertaking to establish values altogether out of proportion with prewar values. The public is prone to believe that such a tendency involves taking something away from the rate payer and giving it to the public service corporation. The average person is likely to regard such a tendency as vicious without ever stopping to consider that a new price level has been developed as a consequence of the war. Either we have got to take particular

*Abstract of paper presented at eleventh Midyear Meeting of American Electric Railway Association, Indianapolis, Ind., Feb. 28, 1922.

pains to explain the significance of this new price level to the rate payer or proceed very cautiously in recognizing it at all as an economic factor in evaluations for rate making.

WHAT IS A REASONABLE RETURN?

Before the war, when a well-managed utility could sell 5 per cent bonds at par, 6 or 7 per cent was considered a reasonable rate of return. Let's see what have been the results of the war when viewed from this angle.

Due to the delay of the utilities in seeking increased rates and fares, the delay caused by uncertainty at the outset of the war, and the delay finally caused by the inability of regulatory bodies to dispose of petitions for increased rates and fares promptly, even in the case of the best managed utilities, half or more of the 6 or 7 per cent return was wiped out by increased operating expenses in the early days of the war. Most of the utilities came through the war with a return of less than 4 per cent, which the bondholder and stockholder found to be worth less than half of what it represented in purchasing power before the war. In other words, the 6 or 7 per cent return shrank to less than one-third of its former value.

Is there any reason why, when refunding became necessary or when new capital was sought for additions and extensions, the former bondholder and stockholder should have been expected to put up the money? They were thoroughly disgusted when their own income was reduced by two-thirds while all around them were the profiteers operating with little or no restraint or regulation. Even the farmer in this period was enjoying returns of three and four times the normal return.

I believe anyone will agree with me that a 7 per cent return upon \$150,000 is equal merely to a 7 per cent return upon \$100,000 if \$10,500 in the first instance will buy no more than \$7,000 in the second. Nor is the rate payer being hurt if he, himself, is earning \$1.50 where he formerly earned only \$1. He is benefited or damaged by the "inflation" of values in the same degree as every other person or enterprise.

What has happened to public utility credit as a consequence of the war?

Seven and one-half and 8 per cent bonds have replaced 5 per cent bonds, and the former cannot be sold except at a heavy discount, the money costing the utility from 9 to 11 per cent. What has become of the margin between the interest rate on your long-term bond and your 6 or 7 per cent rate of return? The margin not only has disappeared but it has become a minus quantity. In other words, the interest rate on your new bond, sold to refund a maturing 5 per cent bond or to finance absolutely necessary improvements, exceeds by from 1 to 5 per cent the old rate of return, an adjustment which has thrown the whole structure of public utility finance out of joint but an adjustment which regulatory bodies have been powerless to forestall

or prevent. So far as this condition is to continue permanently, simple justice demands an increased rate of return. Not only simple justice to the utility demands an increased rate of return but the public interest likewise.

I am in active sympathy with the assault that is now being made upon tax-free securities. Within the past twenty years the country has been flooded with securities of this character. My own notion is that if we were able to put these public obligations on the same tax basis as other securities, they would immediately lose a good deal of their attractiveness and not only would the standing of public service corporation securities be improved but public officials would find it more and more difficult to pile up the public debt. Any restriction or limitation upon tax-free securities automatically would result in restricting and limiting, to that extent, expenditures from the public treasury because the investing public would be reluctant to buy them.

Industrial expansion within the next twenty years will depend, in my opinion, more on the development of cheap electrical power than on any other single factor. We have got to make the development of electric power attractive to the investor or his money will go elsewhere. Here in Indiana, the Public Service Commission is doing everything it legally and morally can do to encourage this development in the sincere belief and confidence that it will redound to the benefit of the whole State. We take pride in what we have done already in this direction.

In the operation of electrical railways, as I understand it, from 20 to 30 per cent of the total operating expenses are incurred in the production or purchase of electrical power. Any material saving in this item is of very great importance in the cost of street railway service and therefore has a substantial bearing on the gross income of a particular company and the rate of fare paid by the public.

COMPANY PUBLICITY HELPFUL TO COMMISSIONS

I believe that if the American Electric Railway Association were able to convince the public that under a regime of regulation it is impossible for the electric railways to take anything away from the public to which the electric railways are not entitled, your problems and our problems would be very greatly simplified. It is unfortunate that mutual suspicion and mistrust still prevail as between the public and the public service corporations and yet it is only through the elimination of this suspicion and this mistrust that reasonable fares and public co-operation can be had.

How can it be done?

By keeping the public advised of your business.

The average person is perhaps unable to understand the corporate balance sheet or income statement, but the average person is able to understand a newspaper story which tells the

story of your financial operations. The public does not believe you are losing money in operating electric railways and will hardly believe you are losing money if you make the statement only once and let it go at that. You will have to keep telling the story, as well as the story of what you are doing to make the public comfortable. The newspapers will be generous enough to print your statement and to keep printing it if you can put some human interest in it. The public wants good service, and if you can drive home the connection between comfortable transportation service and reasonable fares, the public will pay reasonable fares with very little complaint. It is only an uninformed and ignorant public that any of us need worry about.

Of course, the thorough education of the public is a tremendous job. The public does not mean to be unfair, and it is only its failure to comprehend the truth which causes trouble. The same people will relieve a publicly owned utility from taxation, pay exorbitant rates and endure poor service, and at the same time they will harass the privately owned utility which pays its share of taxes, operates at reasonable rates and furnishes good service. This is not because they mean to discriminate but because they are unable to make a fair comparison between the publicly and the privately owned utility.

As a public service commissioner, I have run into too many cases of mismanagement and inefficiency in the field of the municipally owned and operated utility to believe that public ownership is any guarantee of good service at reasonable rates. On the contrary, we are generally surprised to find a publicly owned utility that is also well operated. We find altogether too much inferior operation and management among the privately owned utilities, yet the cases of intolerable operation and management are comparatively few.

It has occurred to me that the preparation of comparative studies in the field of publicly owned and privately owned utilities and the dissemination of absolutely accurate information which the public can understand would prove very helpful. I am sure the public would welcome this information. It will depend somewhat upon its being kept wholly impersonal.

May I say that we are all entering upon new experiences in the field of business? Transportation is more particularly an adventure today than ever before. We cannot be absolutely sure about anything. The business in which you are engaged particularly is filled with uncertainties and doubts. You have passed through trying times already. The future is not inviting. Let us hope that with wise counsel in high places we shall be able to weather the severest storms. Let us hope that we shall be able to approach all our great problems, and especially that of transportation, with mature self-restraint, with seasoned thought, with vision and with courage.

"A Bond in Every Home"—The Woman's Viewpoint*

By Antoinette Funk
Attorney at Law, Washington, D. C.

**The Entrance of Women Into Affairs Means Much to Electric Railways and Other Public Utilities for It Is Principally the Local Institutions and Service in Which Women Take a Direct Interest
—Women Have a Large Purchasing Power and Through Them Securities Should Be Distributed to the Consuming Public**

I WAS originally entered on the program to speak on the subject, "The Woman's Viewpoint," and I see now that the subject has been changed to "A Woman's Viewpoint of Electric Railways and Electric Railway Service." As a matter of fact, I was called up from New York and told I was to speak on the subject "Why a Woman Gets Off a Street Car Backward," and I was ready to make a speech on the subject, "Why Women Do Not Get Off a Street Car Backward," because we are the one-half of civilization who watch our step and are looking forward. The opportunity to show that was taken away from me when I read on the menu card this evening the subject, "A Woman's Viewpoint of Electric Railways and Electric Railway Service." I have never made, in my lifetime, a great use of the titles given me to speak upon. I think, indeed, that they are sometimes a polite suggestion from the committee as to what should not be discussed.

So I shall make my remarks without reference to the subject printed on the program, for I think what you want me to talk about are not electric railways. Why should I talk to you on that subject, to you who know everything in the world that is to be known about electric railways? What do you care about my point of view on electric railways. What I believe you want me to say is a few words, perhaps, on what it means now that all of the women of the United States are into everything.

It is only a short time since I met in Washington a member of one of the national committees of one of the great political parties, and it happened a short time afterward that I met the chairman of the national committee of the other party. I had known both men for some time and they stopped and talked politics with me, so they said, but what they really said was, "How do you suppose the women would feel if we do this, that or the other thing?" I said, "The trouble with you men when you get away from your own firesides, so to speak, and get into spheres where there are large numbers of women concerned, you lose your good sense. You seem to forget we



MRS. FUNK

are individuals, the same as you are. You have an idea we are a sort of composite body, and you begin to think of some kind of a gewgaw or a stick of candy which you can hand to us and we will be pleased. We have just as many opinions and viewpoints and as varied feelings as men have, and we differ just as much one from another as you men do; as a matter of fact, I think we differ more. Take a group of seven or eight men, and you will find that sometimes such a group of men will be divided in their opinions so that they represent seven or eight different opinions, but if you get seven women in a group, they will have eight opinions, one for each woman and one for the group.

So you see, there are no very broad laws or viewpoints that control the actions of women, but there is a certain trend in affairs that has been brought about by woman's entrance into the broader fields of American life, and I think that is a fortunate thing for such men as you here tonight, who are interested in great undertakings of such public importance as the electric railways.

I understand that the electric railways of the country, along with other industries, are undergoing a period of readjustment, and I think that it augurs well for the electric railways that this period of readjustment comes at the time of women's active entry into the field of affairs. I really think it is a wonderful thing. I am not here just to be complimentary, but I am going to be truthful, and sometimes that is better than being complimentary. I

think it is a wonderful thing that has been accomplished in a short generation or two in the matter of the development of electric railways. I will confess my ignorance—I do not know when the first electric railway was built and operated, and I was trying to think, on the train last night, of some sort of a milestone by which I could fix the time, but I was unable to do it. But I do remember a certain railway milestone, and that milestone was planted a little way East from here in an Ohio village, something less than one hundred years ago.

When the group of people who were interested in getting a railway through that certain county asked the Board of Education to permit them to hold a meeting in the schoolhouse, in order that they might discuss ways and means for bringing the railroad to their community, the answer that came from the President of the Board of Education was something like this: "The schoolhouses are always open for matters of education, but we have no intention of promoting the devilish schemes of a set of people who want to bring terrible machines into our midst which will travel at the terrific rate of speed of 15 m.p.h."

Now, that is less than a century ago, and if I may make a parallel in the development of the thought of the world, particularly in reference to women, I want to say that about the same time, down in the little sister state of Connecticut, they had a law on the statute book taken from the law of old England that a man might beat his wife whenever he wanted to, as often and as hard as he pleased, provided only that he used a stick no thicker than his thumb. When there was a resolution introduced to abolish that law, a minister, if you please, by the name of Tanner, got up in the Assembly and said "that if an American husband residing in the State of Connecticut were not permitted to beat his wife with a stick no larger than his thumb, the foundations of society would be undermined."

Now, I have been listening all my life, until within the last few years, to men's views on how women, by their actions, in seeking to extend their personal liberties, and in securing political recognition, were going to undermine society.

When I used to make suffrage

*Abstract of an address delivered at the Midyear Dinner of the American Electric Railway Association, Indianapolis, Ind., Feb. 28, 1922.

speeches all over the place I was invariably confronted with the argument from a number of men that if suffrage was extended to women, society would be undermined. And again, in this connection, we may go back, if you please, to England, not so many generations ago, when the plain people were asking that they might have a representation in the Parliament, and the powers that be, the kings, the dukes, the earls, the barons and all the rest of them, set up the cry that if the plain man—by that meaning really the farmer—was permitted representation in Parliament, the crops would rot in the field.

It is only a few years ago—not more than ten years ago—that I heard men say in open debate that if women voted, if they were permitted to go to those dangerous and fascinating places called the polls, they would not sew on any buttons, they would not cook any dinners, and they would not take care of the babies, because they would be so active in connection with outside matters that all their time would be taken up in that way.

I went back to Illinois from Washington and voted when the women cast their first vote for Mayor of Chicago. Upon leaving the door of my home, I took my watch in hand, and went around the corner to the voting place in a barber shop, which was arranged with a voting machine, and there were nice flowers in the shop, with a mirror in it, and everything was very pleasantly arranged, and there was a place next door where the women could leave their babies. Those were the circumstances under which I cast my first vote. I thought that it would be necessary for me to spend the entire day in doing it, but as a matter of fact, I got back to my home in seventeen minutes, having discharged my duty as a citizen in voting.

WOMEN ARE INTERESTED IN LOCAL INSTITUTIONS

Now, these things are here, whether people like it or not, whether they prefer the good old days when women had nothing to say makes no difference. The problem must be faced. I could talk a long time about women in politics, but I want to say this: Women in politics in my judgment (and I base my judgment on what they have done politically in the time they have had the vote, I do not mean since the National Amendment was passed, because you know some of the women have had the vote almost during the entire period of my life, that is, in some portion of this country), women in politics, I believe, are actually conservative. I believe women have a great respect for institutions, not only for political institutions, but for social institutions—I know they are very radical and wherever there is, as Roosevelt used to call it, any human necessity, in connection with women and children, or the welfare of the home—mark that particularly, the welfare of the home—women will take a great interest.

Women are not going to run into

politics in the sense that they are going to try to hold all the offices. You would be surprised how hard it is in the states where they want women to run for offices to find one who is willing to do it, but women are particularly keen, politically, about the things that they can see and understand, and any of these women who are here—and I see some of them I have known a long time in the work for women—will tell you that what we used to talk about most was not that we were going to see that such and such a treaty was passed. No, indeed, we are very modest. We said, Of course, men will know more about treaty making and about the canals and men will have a better understanding about reciprocity, but it is local self-government we are concerned in first, the things that lie at our doors.

THE WOMEN ARE THE GREAT SENTIMENT MAKERS

I can remember when I have spoken on the question of having to hang, not by my hands, but by the tips of the fingers, onto a strap in an electric railway car, and of other similar experiences in the ordinary routine of daily life. We have talked about all those things and all the rest. That is our material. Those are the things we won our suffrage on—the street railways, telephones, electricity, pavements, and all of the features relative to the rest of the utilities, that was our best ammunition. I think that women have come into a broader understanding of all these things and that is the point where women become very important to you.

You have heard Mr. Insull and other speakers here this evening refer to the value of harmonious public relations between the utilities and the public. Do you know that the women are the great sentiment makers of the world? I have found that out; I found it out during the war; I guessed it before, but came to an absolute conclusion during the war that such was the case.

I want to refer to an organization you know well, but I want to tell you a little of it in detail, and that was the great Women's Liberty Loan Organization, which extended its activities all over this country. I remember the day when I was first shown into the office of the Secretary of the Treasury. It was during the First Loan and he asked me if I thought the women could organize sufficient sentiment among the women of the country to get them to sell the bonds, and this to include not only the women who were to sell the bonds, but the women who were to purchase some of them, and I answered, "Yes, but I want to say to you, Mr. Secretary, that there is one great way to organize sentiment or organize anything else, and that is to give the people responsibility. Now, why don't you couple with this organization a sentiment for the sale of bonds to and through the women of this country?"

The Secretary of the Treasury then

asked me how large a volume of bonds I thought the women's organizations in the country could dispose of. I was afraid that he would consider me crazy if I told him the figure which I actually had in mind, but I summoned up courage and said that I believed the women of this country could sell half a billion dollars worth of bonds. When we finally closed the books, we found that we had sold five billion, five hundred million and ninety thousand dollars in bonds.

"A BOND IN EVERY HOME"

You may well be pleased at that, because these bonds were sold principally to women, and these purchases absorbed mainly the fifty dollar and one hundred dollar issues. You do not know what women can do in various lines of endeavor. You do not realize the sacrifices that they can make, and this is of interest to you gentlemen who are assembled here, because if this millennium which you have held before you, when the public is with you, is to come at all, it will not come until some such slogan as this has been adopted by all of your companies—"A bond in every home," and you will never get a bond in every home except through women.

I do not suppose you realize, perhaps—I did not until some time ago when I had occasion to look it up for the State of Illinois—how much money the women of this country represent. At one time they owned one-fifth of all the wealth in the great state of Illinois. In some states they have a great deal more wealth and their earning capacity is simply enormous. I tried to get some figures on that, but I regret to say that the census figures were not completed before the time I left, and I was not able to get the figures I desired.

WOMEN MAKE GOOD BOND BUYERS BECAUSE THEY ARE NATURALLY SAVERS

I want to say that this enormous amount we realized on bonds was through sales to women, in very great measure, not entirely, of course, but in very great measure. Women are natural savers, even though they may be earning small amounts, because women who earn money very seldom earn a very great deal of money. Take a woman earning \$1,400 a year and put her alongside of a man who is earning \$1,800 a year, or \$2,000 a year, she will have more money saved at the end of a year than he will have and the examples that came to us were wonderful.

The good people who run the utilities would find a wonderful market for their bonds among the women of the country. Women have been shown the mirage of rubber plantations in Mexico, every kind of blue sky operator has done them up, and women would be glad of opportunities to make safe investments.

Again, it would be a question of local self-government—you could have no better guarantee, no better backers, no better group of people behind you

than a good representative number of the women in any community as holders of your investments. Mr. Insull referred to a company in Minnesota which had adopted the plan of selling its securities to the people living in the communities which that company serves with gas and electricity, and referred to the very great success of the company in that respect. I say, again, that a public utility can do no better than to have a group of intelligent and interested women as holders of its securities.

Then, there is one thing which you must remember, above all, and that is that the women have the vote—do not forget the vote—that is a very great thing.

And now, in closing, I want to say one more word to you and that is that women, for the first time in their

lives, are understanding the meaning of taxation; for the first time in our lives we women are really getting a comprehensive view of what it means to pay taxes. Women now know what taxes are. This is your golden moment to educate the public through your women. Remember that they are the leisure class, too. They are the people who have the most time to think and talk about these things, because after all, the great majority of women are in the homes. You must teach them while you are trying to sell them what you have to sell—you can teach them what taxation is, you can teach them that if the taxes are too high on your properties the fare must of necessity be higher than if the taxes were lower.

Remember that the public utilities are something that belong to the home.

If you need an example of how women feel about that sort of thing turn to Des Moines. I read in the newspapers that, after the street railways had been closed down and they were running the jitneys, it was a group of women who insisted that the street railways be operated because they insisted that the jitneys were unsafe for their children to ride to school in.

I have given you a disjointed talk on women in relation to your own special interest, but remember, when you are dealing with women in public, they are exactly like the women at home, whether they be your wife, or mother, or daughter, or whoever the woman may be. Forget that you are specialists, and forget your great technical learning, and treat the women as plain, ordinary, friendly, everyday human beings.

Public Relations— The Most Important Asset a Utility Can Have*

By Samuel Insull

President the Commonwealth Edison Company, Chicago, Ill.

**Extending a Proper Conception of the Economics of the Public Utility
Business Is a Prime Consideration in Securing Public Good Will—
Methods of Accomplishing This Are Outlined and Illustrated**

I AM inclined to think that if I had to choose between having ample capital, fair rates and absence of all incidents interfering with income such as jitneys and buses, on the one hand, and the question of friendly public relations on the other, I would, based on my experience in public utility business, accept the latter alternative. It matters not how much capital you may have, how fair the rates may be, how favorable may be the conditions of service, if you have not behind you a sympathetic public opinion you are bound to fail.

And I am inclined to think that more or less of the troubles that have afflicted some, not all, of the utilities during the period of the World War and the period of inflation following the armistice can be traced more to a lack of proper public relations—to a lack of public sympathy—than to any other cause.

I think that you and I and the people engaged in the public utility business are largely responsible for that situation. I am not one of those who believe that the public utility business has perceived the light and been redeemed.

As I stated at a luncheon given by the Mid-Day Club in Springfield, Ill., a few weeks ago, I am a man proud of my business, proud of my relations with it, and if it were possible for me to start my life over again and start with the experience I have today I would go into the public utility business. I know

of no field of endeavor that offers the opportunities, not so much of personal emolument, but the opportunity to add to the wealth of this great commonwealth. I know of no group of businesses that have to a greater extent made two blades of grass grow where one heretofore grew; that have added more to the material wealth of the state; whose businesses have made possible greater economies in the manufacture of the articles that we wish to ourselves and the peoples of the world than have the various branches of the public utility business.

Our trouble lies mainly in the fact that for a great many years we lacked understanding of the economics of our business ourselves and that at this time a knowledge of the true economics of the various public utilities is confined to a few of the people engaged in those businesses. What we need worse than anything else is to sell our business to our own officials and employees and then sell it to the public.

You can't expect to get proper treatment from utility commissions, you can't expect to get proper treatment for your customers, when the fact is there are so few of the people who work for us, to say nothing of the people themselves, who have the slightest conception of the economics governing the business that we are engaged in.

Now involved in this question of public relations is, first, our relations with our employees. How many employees of an electric light company or gas company or street railway company un-

derstand anything about the elements making up the cost of production, elements that should govern the establishment of proper rates.

Take the business that you people are more particularly interested in—street and interurban railway business. How many of your employees know the effect on cost of service of all of the various obligations that you are subject to under your ordinances? What effort have you ever made, and I might say the same thing of an electric light company or gas or water company, what real effort have you ever made to establish a thorough knowledge of these conditions in the minds of your own people? And before you go out afield to capture the public the first thing to do is to capture your own people who work for you and expect to stay by you, year by year. Then when you have done that, when we have all done that, I think our next job is to give the public a better understanding of our situation. They have had to learn something about it during the period of the war, but there is a vast range of subjects that they should consider.

Why should it be considered fair compensation in a city like Chicago to carry people 30-odd miles, I think it is, for 5 cents just as it was considered ten, fifteen or twenty years ago fair compensation to carry them 1½ to 2½ or 3 miles for 5 cents? Why should the user of your service be subject to the double taxation, as he is subject to double taxation, when included in your fare is the repair of part of the streets,

*An address delivered at the Midyear Dinner of the American Electric Railway Association, Indianapolis, Ind., Feb. 28, 1922.

the carrying of policemen, the carrying of mailmen and the carrying of everybody else who can present a star, without compensation?

Why should those conditions be allowed to exist? How much does the public know of such subjects of that kind—just a simple little proposition.

Now, how are we to reach the public? First of all, having reached our own people and having created an army of experts who can go out and spread the gospel for us, what is the best way of reaching the people? How many street railway companies advertise that they have something to sell? Yet they are in the business of selling local transportation. The vast majority of them assume that everybody has to use their service. Their advertising is of a most limited character and yet they have service to sell; they have transportation to sell just as much as the trans-continental lines have transportation to sell. I can well remember the time when it was looked upon as rather ridiculous for the local electric light company to advertise the sale of electric energy; it covered the territory and had a monopoly on the business, so why waste any money on advertising. I remember that subject being very seriously discussed in various electrical technical journals. It would be looked upon as absurd today. Why should not the local street railway company be just as much interested in creating an atmosphere of friendliness and friendship and desire to use its service as the local dry goods store and the local department store are anxious by spreading wares either in the window or in the public press to tempt customers to the stores? Why should not the same method be universally followed in selling local transportation? Why are not the advertising columns of newspapers used to a far greater extent than they are in conveying correct economic information with relation to our various public utilities? People get their information mainly from newspapers. Prejudice created against us is created very largely in newspapers, and I think that it is a fair item of cost—the advertising of the advantages of the product that we have to sell and all the elements making up the cost of that product. It is a fair item of cost of service to add to the enlightenment of the public on those subjects by advertising.

UTILIZING THE EDITOR'S TENDENCY TO FORM HABITS

Now, then, take another phase of reaching the newspapers with the idea of creating proper public relations and sentiment. What the editor publishes is very largely a matter of habit. One time he talks a good deal about the mercantile marine, another time about the steel business, another time about the coal business, and why not get him in the habit of talking about the public utility businesses that you have. There exists in a number of states a state committee on public utility information. We got the idea from some of our activities in Illinois during the war and

started the Illinois Committee on Public Utility Information. We engaged the best experts we could find when we wanted something on financial topics; the best writers when we wanted something on some special topic, and we make a practice, week after week, to communicate with about eight hundred different local newspapers. The effect has been tremendous throughout the State. That same class of work is being done here in Indiana and in a great many other states. It is helpful in the creation of the proper kind of public sentiment. But you have to go with the right kind of information. It is no use just to present an argument; you want to present facts, and you have

Mr. Insull hits the nail on the head, thus:

Our trouble lies mainly in the fact that for a great many years we lacked understanding of the economics of our business ourselves and that at this time a knowledge of the true economics of the various public utilities is confined to a few of the people engaged in those businesses. What we need worse than anything else is to sell our business to our own officials and employees and then sell it to the public.

got to go with clean hands and you will get a hearing. You have all the machinery in connection with your association for getting that kind of information and it is simply a question of applying its use. To my mind it is the most important job that the manager, president or chairman of any public utility corporation can apply himself to. It is of more importance to him, as I said in my opening remarks, than all the rest of the things put together, because if you have not a proper public relationship, capital will disappear, rates will become onerous, conditions of service will become offensive and your customers will go by the board, I care not what may the protection of the courts or institutions. We have all of us a great mission in this respect. It is not only a duty we owe to our ourselves and our stockholders, but a duty that we owe to the community of citizens.

And I will tell you another way of spreading the gospel. Take the people into partnership with you. Last evening at 5 o'clock I attended the annual meeting of the stockholders of the Commonwealth Edison Company. A few years ago it used to be difficult to get a sufficient number at the meeting to propose the different resolutions. We have 25,000 stockholders and we had 1,500 at the meeting yesterday afternoon. That of itself is a great protection to that particular property. It reminds me here of an incident of what

occurred in connection with one of the Byllesby properties in Minnesota. Jones returned from the annual session of the Legislature and remarked to his next door neighbor and he said: "Bill, don't you think it is about time we went for this electric light company?"

"What electric light company?"

"Oh, this electric light company here."

"Oh, you mean *our* electric light company!"

And Jones said:

"What do you mean?"

"Oh, you have been away; you had better go around and you will find that you are the only man in town who is not a stockholder!"

I had an experience myself on the west side in Chicago. We sell Commonwealth Edison stock on the installment plan in small amounts to our customers. One of my canvassers was delivering a certificate of stock one evening and the subscriber said:

"This is my company, isn't it?"

"Well, as far as that stock is concerned—the proportion it bears to all the stock."

"Well, I can be a director?"

"Yes, if you can get enough votes."

"Well, then I am really interested in that property. Well," he said, "the fellow around on the other side of the block has been boasting of stealing current from you people for years and I'll be darned if he is going to steal it from me."

And on that tip we collected three years from that boasting thief.

AN ILLUSTRATION FROM ROCHESTER

I was sitting in the office of Mr. Searles, manager of the Rochester Edison Company, a few years ago and asking him about this very subject—about the sale of securities to customers and the effect it had upon the general sentiment of the community, and the telephone bell rang. It was Monday morning and somebody called him up, Jones, we will say:

"You don't happen to know me, but I'm a stockholder. There has been a lot of cable and wires lying outside my house ever since Saturday and I'm afraid it will get lost. I wanted to know whether you had any work around here just now. Of course, if it is telephone cable I don't care about it; but if it is electric light cable I want you to clean it up."

That's the practical side of this thing. I told a meeting of bank clerks last week in Chicago that what we were engaged in doing was selling our property of the Commonwealth Edison Company to the community as individuals; that we did not believe in municipal ownership where it involved municipal operation because of the gross extravagance of every form of municipal operation, but we did believe in community ownership through our individual customers. And the more you can do of that kind of thing the more people will be interested in getting a proper idea of the principles governing our business and the easier will be your job to establish proper public relations.

A Commissioner's Viewpoint on Some Electric Railway Problems*

By Hon. W. D. B. Ainey

Chairman Public Service Commission of Pennsylvania, Harrisburg, Pa.

Management Must Be Allowed to Perform Its Proper Function — The Pennsylvania Commission Is An Inquisitorial Agency with Corrective Functions—Statutes Have Never Answered Any Great Crisis—The Human Element Must Solve Our Utility Problems

UNDER our modern conception and as the result of the complexities of our civilization in these days, the utilities of the nation no longer relate themselves to the category of private enterprises. The comfort and happiness of the people is dependent upon them and their measure of operating efficiency is a measure of their reply to the nation's challenge for service.

The economic and business prosperity of a nation, and, in consequence, the well being of all our citizens, is largely dependent upon the sound and functioning conditions of the two great circulatory media, arteries through which flow the lifeblood of the country—finance and transportation.

This meeting of your association and the duties devolving upon the public utility regulatory bodies of the land naturally needs the emphasis of these remarks to be placed upon the latter.

To the clarity of our thinking, it is necessary therefore that we divest our minds of the underbrush of some specious reasoning. Let me therefore present for your consideration some suggestions applicable to the utility problems as a whole, in order that from the general we may pass to the specific.

Recognizing as we do, that utility service is necessary for the public's benefit, it follows that that benefit cannot continue except by the preservation of these utilities upon standards of efficiency and economy.

There must come a greater appreciation on the part of the public of the benefit which they derive from transportation and the necessity on their part of greater co-operation in securing it. On the part of utilities in general and transportation companies in particular there must be an ever-increasing emphasis made upon their public responsibility in the rendition of their services; and on the part of the regulatory bodies of the state and nation there must be a clearer understanding of their duties and relationship both to the public to be served and to those companies which render the service.

A sympathetic rather than an antagonistic approach must be made by all these factors in order that each may understand the difficulties and the necessities which confront the other.



HON. W. D. B. AINEY

In final analysis and speaking broadly it is in the management and in the management alone that there is to be found the solution of the utility problems of the country. Upon the shoulders of management have always rested and will continue to rest the responsibility for the success of any enterprise, whether that enterprise be public or private. When management is dethroned, is unduly hampered or fails, the business ends, and to the extent that the public are interested in that business, the public suffers.

In so far as public utilities are concerned it should be the policy of the law not to permit that managerial responsibility be avoided. Responsibility, however, without authority to make itself effective, is vain.

Responsibility is but another term by which to define the "right, or reciprocal duty, of initiative." But if this opportunity to exercise initiative is destroyed then responsibility is but an empty name and management fails. A handmaid of initiative is "incentive" and a major difficulty in the regulatory program of our laws is a failure to provide for or to recognize and thus spur on that incentive to greater effort on the part of our utilities.

There is a provision in the public service company law of Pennsylvania which is a source of considerable gratification to me. It is one wherein due allowance can be made by the commission for efficiencies and economies in operation, and thereby furnish an opportunity for management to secure that extra reward which comes from good, as distinguished from poor, operation. A modern tendency which

has caused me some anxiety and to which both the public and the utilities themselves have contributed is to substitute statutory standards for managerial judgment until today as a nation we are suffering, to the public detriment, from too much law and too much substitutionary judgment under the guise of regulatory policies.

The Appellate Courts of Pennsylvania have defined the Public Service Commission to be a corrective body with inquisitorial powers. It is a source of much gratification to me that this enunciation, which was buttressed by sound economic thought, has been made and it places the utilities and the commission of our state in that relationship which under our law should enable the utilities properly to function in public service, and subjects them only to the proper limitations that their rights of initiative shall be exercised and bounded by just and reasonable rates, service and practices.

Whenever either the public feels that it has been aggrieved or our utility companies are of the opinion that they have been hampered, with equal celerity they are inclined to rush to the legislatures of the states or to the congress of the nation for statutory relief, until we are rapidly becoming a nation burdened with a complexity of statutory enactments calculated to control the most intimate relations of life, in the doing of which we are continuously centralizing authority in Washington until it is evident that local matters to a large extent are lost sight of in the broad train of a nationalistic concept.

I have used the term "management" advisedly as a factor as distinct from capital as it is from labor. Of course capital selects management as management in turn selects labor. Management is responsible for the continued support of each and cannot succeed without the support of both. Management's duty is to preserve the property for the benefit of and to secure if possible a fair return to capital; to give to the public adequate service at reasonable rates and to labor an adequate wage and proper working conditions. Management has the further burden of providing incentive for capital as it has the duty of securing incentive to labor, and it likewise is called upon to secure a fair measure of public sympathy and support by prac-

*An address delivered at the Midyear Dinner, American Electric Railway Association, Indianapolis, Ind., Feb. 28, 1922.

tices calculated to inspire the public's confidence. I quite agree with you that these are more easily stated than they can be effectuated, but I venture this conclusion with some assurance that the answers are to be found not primarily in statutes but in sympathetic public contact.

Probably no class of utilities has had its revenues depleted and its operating expenses increased to the extent that the electric railways have. There are several contributing causes. One of these is the advent in increasing numbers of the privately owned automobiles. In Pennsylvania ten years ago there were approximately 10,000 such vehicles, while today there are nearly 700,000. In so far as these vehicles are concerned the situation will no doubt continue and perhaps be accentuated. Some years ago the sole answer to the electric railway difficulty which your companies suggested was the increase in the rates of fare. Several years ago I suggested in two addresses, one in St. Louis before the National Chamber of Commerce, and the other in New York at a meeting of your association, that you could not well afford to neglect the merchandising side and opportunity of your business and coined a word at that time to designate my thought. It is a source of some gratification to find that your principal electric railway journals in recent issues have emphasized this same idea and many of your companies are putting in practice effective programs by which the car riding habit can be and is being increased.

And this is your opportunity. From the broad standpoint of national interest and patriotic expression your companies have, during the period of time when the world was in a whirl of international strife, established themselves in the minds of the people as integral elements in our national existence. During this period of your anxiety and distress, I had greater confidence in the brains and ability back of your organization than apparently you had in yourselves. You are emerg-

ing from many of these troubles, you have demonstrated the necessity for your existence, and where necessity exists, a method by which your continuance will be assured awaits but the master mind of those of your number who have devoted their lives to the railway problems. There are some truths new and others as old and unchangeable as the fixed stars in the heaven. The ability of the world to stand the stress and strain of any great emergency has been that the human element came to the forefront. That was true in the early dawn of history and it is true today.

In the rush and rumble of the world's activity, we are apt to forget, and sometimes think that all things old have passed away in the dawn of a newer day.

Old Neptune lifting his head above the briny depths of the Atlantic a few months ago might have observed a strange monster of the air journeying from one continent to another, disputing as it were, his sway. But had he

stopped for a moment to consider, he would have remembered that a few hundred years before, Columbus, traveling in the opposite direction, journeying from one continent to another, was guided on his voyage of discovery by the same old instrument which charted the course of the aeroplane—the compass.

Bedrocked in our national concept there are the compasses of eternal verity, man's responsibility to man, our duty toward each other, and our national ideal to the preservation of which we owe the highest degree of allegiance. Projecting the past into the future I have no other thought except one of extreme optimism, better voiced by one whose words touched the deep-toned notes of our nature when he said in the dark days of former times, "We have journeyed in safety through the wilderness and crossed in triumph the Red Sea of civil strife and the foot of Him that led hath not faltered nor the light of His countenance been turned away."

Exhibit of Safety Committee

W. H. BOYCE, chairman of the committee on safety of the Transportation & Traffic Association, had a very extensive exhibit for that committee in one of the rooms of the Claypool Hotel. This is one step in the announced policy of the committee to make safety work a prominent feature of the association program this year.

The exhibit consisted of more than 2,000 individual posters, car cards, newspaper advertisements, employees' magazines, company pamphlets and leaflets for distribution in cars, street signs, shop signs, bulletin boards, photographs, etc., all relating to the subject of safety. These exhibits for the most part were mounted on beaver board and arranged so as to cover all four walls of the room in which the exhibit was held. They represented all forms and styles of safety warnings, from enameled street signs to home-made signs. These latter were made

a special feature of the exhibit, the theory being to prove clearly to even the smallest company that there is no reason why it cannot conduct a safety campaign.

Altogether twenty-five railway companies were represented in the exhibit, this being the number forwarding exhibits in reply to some 300 requests sent out by Mr. Boyce.

In addition to the exhibits of posters by railways, the National Safety Council, the Elliott Service Company of Buffalo and New York and the Railway Service Safety Company of Newark, N. J., contributed samples of safety posters and cards issued by them. The accompanying illustrations are two of the panels shown. The one showing the twelve black and white car cards was exhibited by the Railway Safety Service Company. The other panel includes three posters of the Community Traction Company of Toledo.



SPEED UP SAFETY

ACCIDENTS JANUARY 1st. TO DECEMBER 31st, 1921

THE YEAR'S RECORD

THIS YEAR	NUMBER	DISBURSEMENTS
8,468	9,742	\$544,844

SAFETY FIRST

WATCH OUT FOR

CHILDREN COASTING ON STREETS. SKIDDING AUTOMOBILES AND TRUCKS. ICY RAILS.

PROTECT CHILDREN

WARN THEM OF STREET DANGERS

ONE CARELESS STEP MAY MEAN LIFELONG REGRET

WAIT UNTIL CAR STOPS

WHEN YOU HURRY—HURRY WITH CARE

BASEBALL

Is a Pleasure Endured By Many—

LET'S MAKE SAFETY FIRST

A Pleasure Endured By ALL!

SAFETY FIRST

public use of a wheel which makes a car driver safe to himself and others.

SAFETY RULES are made for all car drivers to follow and to avoid accidents.

SAFETY ALWAYS FOR EVERY TOLEDOAN YES!

PANELS FROM EXHIBIT OF SAFETY COMMITTEE

Second Joint Convention of Illinois Public Utility Associations

IN THE Feb. 28 issue of this paper, page 288, appeared the preliminary program of the 1922 joint convention of Illinois Electric Railways Association, the Illinois Gas Association and the Illinois State Electric Association. The convention will be held at the Hotel Sherman, Chicago, March 15 and 16. The mornings will be given over to general sessions. Wednesday and Thursday afternoon the several associations will meet in respective section conferences. The banquet will be held Wednesday evening. The final program is substantially as given earlier, but with a few modifications mentioned below.

John F. Gilchrist, vice-president Commonwealth Edison Company, Chicago, will speak at the Wednesday general session on "Co-operation with Illinois Committee on Public Utility Information." This topic will be discussed by W. H. Sawyer, Britton I. Budd, J. R. Blackhall, B. J. Mullaney and others.

The Thursday general session will be opened by Robert I. Todd, with an address on "What the National Associations are Doing," with particular reference to the American Electric Railway Association. The National Electric Light Association will be represented by President M. R. Bump, chief engineer of the Doherty Operating Organization, and the American Gas Association by Vice-President R. B. Brown. William L. Goodwin, assistant to the president Society for Electrical Development, will speak on "Some of Our Problems and How to Overcome Them."

As previously announced in more detail, the electric railway section will discuss traffic relations between steam and electric railways, advertising electric railway service, the modern electric railway franchise, recent developments in safety car design, wood preservation and bus lines as aids to electric railways.

C. E. R. A. Will Take Six-Day Cruise

THE executive committee of the Central Electric Railway Association met with the hotel and arrangements committee in Indianapolis on Feb. 28 and approved the plans proposed by the latter for having the summer convention on board the S.S. South American in connection with a six-day cruise on the Great Lakes. The cruise will start from Chicago on Sunday, June 25, following the route indicated by stops at Mackinac, Detroit, Toledo, Cleveland, Charlevoix, Traverse City, Ottawa Beach, Benton Harbor and thence to Chicago, arriving there Friday afternoon, June 30. With these various stops it will be possible for the members to pick up the party at a point to suit their convenience, time available and pocketbook. The entire cost for the

full trip, which will be taken by a large majority, judging by last year's cruise, will be \$70. This is \$5 and war tax less than the cost last year. The cost of any part of the trip is proportional. The detail schedule and rates will be published later. The committee urges that members lay their plans and make reservations early with John Benham, 15 South Throop Street, Chicago.

Railway Engineers to Meet in Chicago

AS USUAL, the American Railway Engineering Association will hold its annual convention in Chicago. This will be the twenty-third annual convention, and the meetings will be held in the Congress Hotel March 14 to 16.

Tuesday March 14, will be occupied with the president's address, the reports of the secretary and the treasurer and the reports of the committees on yards and terminals, electricity, ballast, iron and steel structures, standardization, signals and interlocking, ties and track. On Wednesday, March 15, the reports to be presented include shop and locomotive terminals, roadway, economics of railway location, stresses in railroad track, records and accounts, signs, fences and crossings, water service and uniform general contract forms. The annual dinner will be on Wednesday evening. On Thursday the reports will include masonry, rail, economics of railway labor, wooden bridges and trestles, economics of railway operation, buildings, wood preservation and rules and organization. On Thursday there will be a memorial meeting for John F. Wallace and a closing business session. An excursion to the Gary industrial district will be made on Friday after the close of the convention.

Southwestern Electrical & Gas Association

THE eighteenth annual meeting of the Southwestern Electrical & Gas Association will be held in San Antonio, Tex., May 3 to 6.

The convention will be participated in, also, by the Southwestern Geographic Division of the National Electric Light Association, and delegates and guests will be present from Texas, Oklahoma, Arkansas and Mississippi.

Annual Meeting of Oklahoma Association

THE Oklahoma Utilities Association will hold its annual meeting on March 14 to 16 at the Lee Huckins Hotel, Oklahoma City. General meetings will be held mornings and section meetings afternoons. Among the subjects arranged for consideration at the general sessions are the Kansas industrial law, which will be discussed by R. W. Huggins, presiding judge of the Court of Industrial Relations, Topeka, Kan.; taxation, accident prevention, publicity and a banquet talk on Wednesday night on "What Has Experience in

State Regulations Taught Us?" by Noah W. Simpson, member Missouri Public Service Commission.

Of the subjects of interest to electric railway men to be discussed at the section meetings are the following: Analysis of corporation commission order pertaining to telephone and power line crossings; concerted action and how shall it be taken in relieving street railways of paving burdens; effect of the safety car and modern methods of fare collection on accident prevention; the jitney problem; should electric interurban lines be extended in Oklahoma? the use of electric track switches; possibility of returning to 5-cent fare, and how to inform the public on schedule and routing changes. The meeting of the electric railway section will be held on Wednesday afternoon, March 15.

On Thursday morning a joint session of all sections will be devoted to the discussion of the subject of appraisal and valuation work.

American Engineering Council

THE executive board of the American Engineering Council will meet in Chicago on March 10, at the headquarters of the Western Society of Engineers, Monadnock Block.

Mayor Addresses Camden Section

MAYOR THOMAS W. JACK of Collingswood, N. J., was the speaker at the meeting of Company Section No. 13, held at Camden, N. J., on Feb. 16. In his talk, the Mayor, after recalling some of the early history of street cars in Collingswood, compared the duties of a railway man with those of a salesman, such as he had been for a number of years. He told the men that somewhat more than courtesy is essential in their work and complimented them on the improvement they have made in this line during the last few years.

American Engineering Standards Committee Elects Officers

AT THE adjourned annual meeting of the American Engineering Standards Committee, recently held in New York City, Albert W. Whitney, a representative of the National Safety Council, was elected chairman, and George C. Stone, a representative of the American Institute of Mining & Metallurgical Engineers, was re-elected vice-chairman. Among the eighteen members of the executive committee elected to represent the respective member bodies of the committee are the following: Martin Schreiber, American Electric Railway Association; C. E. Skinner, American Institute of Electrical Engineers; E. A. Frink, American Railway Association (Engineering Division); Eugene C. Peck, American Society of Mechanical Engineers, and John A. Capp, American Society for Testing Materials.

Recent Happenings in Great Britain

Wage Deflation Continued—New Financing Successful—Growing Government Debt a Menace

(From Our British News Representative)

IN THE middle of January the National Joint Council for the tramway industry notified the country that in view of the fall in the cost of living index figure for December to 92 per cent above the pre-war cost, reductions in wages would be made as from the first full pay period in February as follows: Employees aged eighteen and over, 3s. per week (making a total reduction since August last of 8s.); employees under eighteen years of age, 1s. 6d. per week (making a total reduction since August last of 4s.). These reductions come about automatically under the sliding scale, by which wages rise or fall according as the index figure rises or falls. The London County Council announced in the end of January that this reduction of 3s. a week would mean a saving of £98,000 per annum in the working expenses of the tramway undertaking. Other places will benefit correspondingly. In the meantime, however, surpluses will not be commensurably improved.

One-Man Safety Car a Novelty

C. J. Spencer, manager of the suburban tramways associated with the London underground railways, was one of a deputation from the "combine" which visited the United States in 1920 and investigated traffic problems and methods of dealing with them there. Perhaps it is one of the results of the visit that he is now experimenting on the London United Tramways with a one-man safety car, which is a great novelty on this side. It is a single deck car and the driver's platform is fully vestibuled. The brake is a hydraulic track one of the type designed by Mr. Spencer when he was with the Bradford Tramways. There is the usual "dead man's handle." The door for passengers is at the front end, and door and step are operated simultaneously by the motorman. The car cannot be started till the door is shut and the step folded. As the car has been approved by the Ministry of Transport and licensed by the Commissioner of Metropolitan Police, there will be no legal obstacle to multiplying the number of such cars should the experiment prove successful.

Holding Company Carries Out New Financing

It is not often nowadays that a tramway company issues new capital, but it was done during January by the Fife Tramway, Light & Power Company. As its name implies, however, the company is not wholly dependent on tramways. It is a holding company,

and owns the shares of the Fife Electric Power Company, the Dumfermline & District Tramways Company, the Scottish General Omnibus Company, and the Falkirk & District Tramways. Until this new issue the paid-up capital of the holding company was £720,000, along with £236,000 of debenture stock. Good dividends are paid on the ordinary shares, the rate for 1919 and 1920 being 8 per cent. The new issue consisted of £250,000 of 7 per cent debenture stock at £93 per £100 share. Proceeds are to be devoted to developing the company's property. The new stock will be redeemed by a cumulative sinking fund. So keen were the public to secure the stock that the issue was oversubscribed eleven o'clock on the day offered.

Good Results Despite Hard Times

In spite of hard times the Lanarkshire Tramways Company continues to show good results. The revenue for the year ended Dec. 31 last amounted to £227,450, and the expenses to £188,510. After making various deductions, the directors are able to declare a dividend at the rate of 6½ per cent per annum for the second half of the year, making with the interim dividend for the first half 5½ per cent for the year on the issued share capital.

From annual statistics prepared by W. Allison Davies, borough treasurer, Preston, Lancashire, it appears that for the financial year 1921-22 municipal tramway undertakings in thirty-eight towns in England had to receive aid from the rates, while in nine towns contributions were made by the tramways in relief of local taxation. The amount of the subsidy from the rates varied from £80,707 in the case of West Ham down to £325 in the case of Ossatt. The payments made out of tramway profits in aid of the rates ranged from £18,000 in the case of Wallasey down to £233 in that of Nelson. These results are no great testimony to the financial success of municipal tramway enterprise, but of course the year was probably the worst in tramway annals.

Five tramway companies operating lines in the "black country" district of the Midlands are jointly promoting a bill in the present session of Parliament in regard to powers of purchase by local authorities. The system of tramways which these companies work is situated within the areas of a large number of local authorities, who are authorized to purchase compulsorily parts of the undertakings at various dates between 1922 and 1938. The bill proposes to postpone the first date of possible purchase till 1951.

I recently referred to the fact that the London County Council had decided

to institute a system of rewards for useful suggestions or devices by employees for facilitating traffic or work. In this step the Council is following the example of the London underground railways which have a successful scheme of the kind in operation. During the year 1921 these railway companies received 4,149 suggestions. Awards were made in 234 cases.

Expansion of State Debt a Growing Menace

A committee on national expenditure—of which Sir Eric Geddes is chairman—on Feb. 10 issued two voluminous reports recommending reductions of expenditure on various State departments. One of the proposals is the abolition of the Ministry of Transport. The committee is composed of business men, and their instruction was to make recommendations to the Chancellor of the Exchequer for effecting forthwith all possible reductions in the national expenditure. Sir Eric Geddes was Minister of Transport until recently, and he withdrew from the deliberations of the committee so far as the Ministry was concerned. The proposal of the committee is that the functions of the Ministry of Transport should be transferred to the Board of Trade. It was from the Board that some of the functions of the ministry were transferred when the latter was constituted by the Ministry of Transport Act, 1919. The committee says that its proposal is in agreement with an opinion expressed by Sir Eric Geddes to the Prime Minister that with the passing into law of the Railways Act, 1921, a separate ministry would be unnecessary.

The ministry was empowered by the Act of 1919 to carry out many new duties as well as those previously performed by the Board of Trade and other departments. In general it was to improve the means of the facilities for locomotion and transport. It was to co-ordinate and develop existing means and to arrange for the development of new means. The Act was passed at the time of the temporary boom after the war, when magnified ideas were held about the possibility of improving everything almost out of recognition, and the talk was about "making a land fit for heroes to live in." With the general slump came disillusionment, and it was found that, however desirable many things might be, there was no money to pay for them. The ministry consequently was unable to carry out many objects which it was designed to accomplish, but it has done a lot of useful work. Its most important achievement was the Railways Act for consolidating and regulating the railways of the country. The control of tramways, so far as they are controlled, is under the ministry, and it secured the passage of one or two emergency Acts of Parliament for their benefit whether the government adopts and carries out the proposal of the committee regarding the Ministry of Transport remains to be seen.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Saginaw Wants Railway Service

Twenty-five-Year Franchise Being Prepared—Proposed Agreement Includes Bus Line Feeders

Another attempt is to be made to have the Saginaw-Bay City Railway, Saginaw, Mich., resume railway service in Saginaw. Plans are now being formulated and a definite announcement is expected soon as to the attitude of the bondholders and other creditors of the bankrupt property through the protective committee.

Otto Schupp, who was named receiver for the company when an involuntary petition in bankruptcy was filed, has been appealed to by a committee of local business men and manufacturers to start the cars under a twenty-five-year franchise which is now being prepared. The details will be worked out within the next day or two and the contract will be submitted to the committee in New York by the receiver.

Under the terms of the proposed agreement present lines are to be maintained and there are to be a number of bus line feeders. The rate of fare for the first two years is to be five tickets for 25 cents and transfers are to be provided from bus to car and car to bus. After the first two years the question of the rate of fare and service, in case the company is unable to agree with the city on its demands, is to be submitted to the State Public Utilities Commission.

CITIZENS DEMAND RELIEF

Citizens headed by J. B. Kirby who demanded of the receiver that service be resumed laid down the plan which the committee believed would be favorable to the city. The term of the grant is for twenty-five years, although it is revocable at the end of fifteen years by a 60 per cent vote of the electors.

As soon as the announcement was made of the plan, the Saginaw United Club came out in opposition to it. This is an organization which came into being Dec. 10, following the advisory vote of Dec. 7, when the electors by a majority of 871 said they preferred buses to street cars. The members have been working along the line of organizing a motor coach company to be entirely owned by the people of Saginaw. Their plan was to have been presented several days ago, but when the committee's demands for a resumption of railway service were announced the United Club stopped and went on record against the franchise as proposed.

The entire city is wrought up over conditions and business men, who have been hard hit by the lack of transportation facilities since last August, have

become desperate. They assert that business is on the ragged edge and several, interviewed on the subject, assert that unless some substantial transportation system is soon forthcoming business failures will result.

At the present time the fight is a three-cornered one. The United Club, the citizens' committee and the United Transit Company, the outgrowth of the Jitney Bus Association, are in the field. To those who are not identified with any of the movements it appears that unless there is some semblance of co-operation all will fail and the traveling public will be forced to depend upon the jitneys. The operators of the jitneys are frank to admit that these vehicles alone cannot solve the problems. Conditions within the organization are not the best, and because of internal troubles, the City Council has been forced to pass an emergency ordinance placing the entire control of the buses with the police department. At the present time 64 buses are operating and, owned by individuals, they are giving the police department trouble, but not to such an extent as when the owners were permitted to regulate themselves.

Attorney Wants Cincinnati Franchise Forfeited

Demand has been made of City Solicitor Saul Zielonka of Cincinnati that an ordinance be drafted immediately for passage by Cincinnati Council to forfeit the franchise of the Cincinnati Street Railway now held by the Cincinnati Traction Company. The petitioner that this action be taken is Attorney Robert S. Alcorn, who declares that failure or refusal of the City Solicitor to draft such ordinance and have it presented to Council will result in measures being taken immediately to initiate an ordinance and have it submitted to the voters.

Twenty-four counts are brought against the company, ranging from refusal to make extensions to accusing the company of falsely accounting for its gross revenue in order to procure the right to raise fares.

Mr. Alcorn is quoted as follows:

I have a suit pending in Common Pleas Court which seeks to forfeit the franchise, and by agreement this is to be heard March 6. The traction company has answered through Attorney Alfred C. Cassatt, and Attorney Joseph Wilby filed an answer for the street railway company. I do not intend to wait for or depend upon this suit, however, but have demanded that an ordinance forfeiting the franchise be presented to Council, and if this is not done I intend to take advantage of the initiative and referendum law and will initiate such an ordinance myself.

All I will need is a trifle more than 2,500 signatures of petitioners to initiate such an ordinance, and I am perfectly able and capable of securing these, and then we will put the matter up to the public and let it decide whether it wants to continue with the Cincinnati Traction Company as it now is conducting the street railway system here.

Wages Are Reduced in Massachusetts

As Much as Ten Cents an Hour Cut Off Pay in Voluminous Decision at Springfield

The board of arbitration in the dispute between the Springfield, Worcester Consolidated, Milford, Attleboro & Woonsocket and the interstate Consolidated Street Railways and the Attleboro Branch Railroad and Divisions 448 and 22 of the Amalgamated Association reached an agreement on Feb. 23 and made an award which became public on Feb. 28. This award in the case of the Springfield and Worcester lines continued the then existing maximum hourly rate of 68 cents in force up to March 1, 1922, and fixed a rate of 58 cents from that date until Jan. 1, 1923. Questions in arbitration covered the year 1922, the old agreements having expired Dec. 31 last. Operation of the lower rate was postponed until March 1 because the arbitrators decided that the men were entitled to this amount of lag because of the lag in their wages as the cost of living was rising.

Some fifty questions were covered by the decision, which was signed by James J. Storrow, neutral member of the board, and Bentley W. Warren, attorney for the companies, constituting majority of the arbitrators. James H. Vahey, attorney for the employees, filed a dissenting opinion, in which he expressed a belief that the cause of arbitration had been dealt a serious blow by the award.

The board reviewed the wage and living cost conditions during the period from June, 1912, to December, 1921, during which six wage increases of the men became effective. By means of a chart it was shown that up to June, 1920, the rise in wages lagged behind the rise in the cost of living during all the time except a few months in 1919, so that the first four wage increases were found to be unquestionably just. The board also finds that the reduction from ten to nine hours in the working day for motormen and conductors put into effect by the Legislature of 1913 was in line with the movement in other industries.

In June, 1920, the companies entered into agreements with the Amalgamated Association to grant three successive additional increases in pay, as follows: From 57 to 64 cents an hour June 1, 1920; to 65 cents Jan. 1, 1921; to 68 cents June 1, 1921. It was found that in the summer of 1920 the cost of living entered on a sharp decline, amounting to an equivalent of more than \$1 a day in wages between that time and June 1, 1921, following which it remained at practically the same level for the rest of the year. Accordingly the arbitra-

tion board decided that a material reduction of wages was just. On that score it says:

It is true indeed that if we possessed a wizard's wand we would rejoice to permit the employees to enjoy what, since June, 1920, owing to the drop in prices and the two subsequent increases in their wages, has amounted to a very large increase in their actual wages represented by the things they can buy compared with the things they could buy in June, 1920. But no one has handed us the wand and we must all realize that the double fare of 10 cents now charged in Worcester and the two-zone fare which requires the workman to pay 7 cents for the shortest ride in Springfield and 14 cents for many of them to get to their work represents an unqualified burden on men, a large majority of whom at the present time are suffering great hardship due to the present upset economic conditions.

It was shown by a table that the 68-cent wage was considerably in excess of wages paid elsewhere in New England, except on the Boston Elevated, where the rate has been reduced this year to 65 cents.

At the time of the award the 68-cent maximum rate was in force on all the companies involved in the proceedings, but in Springfield the method of payment was by the day instead of by the hour.

The more important findings are as follows:

Wages blue uniform men, Springfield and Worcester: Maximum hourly rate set at 68 cents from Jan. 1, 1922, to March 1, 1922, and at 58 cents from March 1, 1922, to Jan. 1, 1923.

Wages blue uniform men, Milford, Attleboro & Woonsocket: Maximum hourly rate set at 68 cents from Jan. 1, 1922, to March 1, 1922, and 53 cents an hour from March 1, 1922, to Jan. 1, 1923. Employees here get the benefit of the differential for operating one-man cars, in general use on that system.

Wages blue uniform men, Interstate Consolidated and Attleboro Branch Companies: Maximum hourly rate set at 68 cents from Jan. 1, 1922, to March 1, 1922, and 56 cents from March 1, 1922, to Jan. 1, 1923.

Minimum and intermediate blue uniform rates for all companies: Present differential of 10 cents less per hour than the maximum rate shall apply to the new men during the first three months of service, and 5 cents less per hour during the ensuing nine months.

Differential for operating one-man cars: Fixed at 8 cents, as against 13 cents previously and 5 cents asked by the companies.

Outside spread of hours in Springfield and Worcester: Spread for spare men in Springfield set at fourteen hours instead of eleven as formerly, and continued at fourteen hours in Worcester.

Daily guarantee for spare men: Seven-hour Worcester guarantee shall stand; Springfield guarantee to be the same instead of full day's pay as formerly.

Hourly or daily method of pay: Hourly basis shall be practice in Springfield as in Worcester.

Union's request for nine in eleven-hour day for all blue uniform men is denied, and hours of work for regular men on all the roads to be continued as under agreements then existing.

Extra pay for more than 13-hour spread to be continued in force.

Platform men on regular runs to get nine hours pay for day of eight hours or more.

Schedule run may consist partly of two-man car work and partly of one-man car work.

No rule to be set against a man performing his eight or nine hours of work without respite.

Request that working week be standardized at six days is denied.

Limited changes of runs to be permitted without putting up the whole schedule for rebidding.

Extra work by regular platform men before the start or after the completion of a run to be paid time and a half, except that compensation for this extra work shall not be less than one hour.

Intervening time between regular and extra run to be paid for at regular rate.

Deadheading to and from regular runs to be paid for at regular rate.

Blue uniform men failing to perform extra work scheduled owing to being late

in ending regular run are not to be paid more than regular full day's pay.

Time allowed conductors for making up reports fixed at twenty minutes in Springfield and ten minutes in Worcester.

Employees to be paid 10 cents for making out each accident report.

Employees' right of appeal to the president of the company to be continued.

Pay of miscellaneous employees to be reduced 16 per cent, effective March 1, 1922.

Standard day set at eight hours for shop men, carhouse men, car cleaners, and line men, as previously.

Track men to work nine hours a day instead of eight, as previously, from April 1 to Oct. 1.

Seniority rules to continue practically unchanged.

Pay for all pitmen and pitmen's helpers set at 60 and 51 cents an hour, respectively, effective March 1, 1922, in place of varying and somewhat higher rates in Springfield and uniform rate in Worcester of 72½ cents for pitmen and 61½ cents for pitmen's helpers.

Regular linemen doing extra work between midnight and 5 a.m. to get day's pay as previously; time and a half for in case of work begun before midnight and finished after midnight.

Overtime pay and regular night pay not to apply to regular emergency crews or to regular or seasonal night shifts.

Vacation provisions to stand as previously.

Men transferred temporarily to work carrying a higher rate of pay are to receive the higher rate during the temporary transfer.

Bentley W. Warren, companies' arbitrator, while joining in the award, ex-

pressed "disappointment at the high rate of compensation fixed for blue uniform men, giving them, he said, an average rate for the calendar year 5.9 cents an hour higher than the average rate of such New England awards and 7.2 cents an hour higher than all such awards introduced in evidence. He also considered the one-man car differential of 8 cents as too high.

Attorney Vahey also protested the one-man car differential, and also the failure to make more marked the application of the nine-in-eleven hour provision. He complained of various changes involving pay reductions. He summed up in a declaration that "the great trouble about this award is that the patient (who is the employee) has been given so much medicine that he is very likely not to recover at all."

Martin J. Hennessey, business agent of the union, said: "We shall have to make the best of it and hope for better things next year." He added that it was the sentiment of the men not to sanction arbitration again on the question of the nine-in-eleven hour provision.

\$19,850,000 Accepted for Detroit Properties

Directors and Stockholders of the Detroit United Railway Agree to Sell to the City on the Basis of Mayor Couzens' Proposal—The Matter of Purchase Now Goes Before Voters for Approval

Directors and stockholders of the Detroit (Mich.) United Railway voted on Feb. 28 to accept the city's offer of \$19,850,000 for the city system, certain real estate not included. A special election is to be called by the City Council to vote on the purchase. A 60 per cent affirmative vote will be required. The initial payment is to be \$2,770,000 with semi-annual installments of \$500,000.

THE week previous the stockholders adjourned without coming to an agreement. Meanwhile the city's offer was increased to \$19,850,000. It will be recalled that Feb. 21 was set by Mayor Couzens in his message to the stockholders at the annual meeting on Feb. 7 as the final date for acceptance of the purchase proposal. The week's delay sought by the company was not looked upon with favor by the Mayor.

After the meeting on Feb. 21, at which a further respite for a week was secured, it was said the stockholders and directors of the company were not all in accord, but it was announced that part were in favor of accepting the city's offer rather than have the Mayor enforce the ouster ordinance and proceed with the construction of municipal lines. This would amount to making the company junk part of its system. The franchise provisions which require the company to replace the paving if the tracks are torn up would force the company to spend a lot of money after the lines had been junked.

The company's representatives endeavored to bring about an agreement on a price approximating \$22,000,000 and it was stated that that amount was needed by the company to offset its bonded debt and outstanding mortgages.

Under the city's offer as finally accepted there will probably be two questions submitted on the ballot at the next election. One proposal will be for

authority to purchase the company's system and the other will be a bond issue to provide for the initial payment.

E. W. Moore, Cleveland, who was returned as a director by the minority stockholders, was active in the purchase negotiations, toward the last.

The offer includes all the company's urban system not already taken over by the city, mentioned in the 1919 purchase plan, except certain land at Grand River and Mackinaw Avenues, and the paint shop in Highland Park.

The question of possession of the Woodward Avenue property was a sticker, since both parties desired it. The Detroit United Railway contended that it needed the property for use in connection with the operation of its interurban cars, while the city wanted it for storage facilities for its Woodward Avenue line and as a repair shop for the municipally operated system. The entire Woodward Avenue property includes paint shops, car shops and carhouse. The property at Grand River Avenue and Mackinaw it was conceded was more desirable to the company than to the city, since it would be of use for storage and repair facilities for the company's interurban cars using Grand River Avenue.

The company has prepared a list of the liabilities against the lines and other property which the city proposes to purchase, which amount to approximately \$22,000,000.

Governor Against Anti-Strike Bill

Governor Miller of New York has declared himself opposed to the anti-strike industrial bills introduced into the Legislature of New York. These bills would make it unlawful for an employer to declare a lockout or for an employee to go on a strike on account of a labor dispute. Governor Miller said:

I had no hand in the preparation or introduction of these bills. I have given such time to a study of them since they have been introduced as I have had at my disposal. I have no hesitation in saying that from the examination which I have now been able to give to them, I am of the belief, and the more I study them the more my conviction grows, that they go a great deal farther in the direction of establishing State-control over labor and industry than the people of this State are prepared to accept.

One of the fundamental objections to the bills, as the matter appears to me, is that they undertake to set up a judicial machinery to adjudicate on questions which I do not think are subjects of adjudication. For example, the question of wages. That is a matter of contract. It can't properly be made the matter of judicial determination according to any settled or known principles of law.

I doubt very much that the State can undertake, for example, to compel people to work for less wages than they are willing to work for and I do not think that a judicial tribunal can adjudicate the kind of questions which must necessarily be left to contract.

What the State can properly do, it seems to me, in the way of helping in the settlement of industrial disputes is along the line of endeavoring to secure fair dealing to prevent abuses, to, as far as it can, set up machinery for mediation and arbitration. And, I think, perhaps, the greatest thing it can do is to secure exact information of the facts involved in these disputes so that the public may know what the facts are.

Civility in Houghton

The "courtesy" idea has hit Houghton. The Houghton County Traction Company, Houghton, Mich., started a courtesy campaign on Feb. 15 assuring both patrons and employees that civility will tend to improve service. Trainmen are urged to be generous with smiles, "thank you" and "good morning" greetings. The patrons are asked to enter the campaign by giving their co-operation and helping to carry out the company's suggestions.

Outlook at Fresno Greatly Improved

F. W. Webster, manager of the Fresno (Cal.) Traction Company, is pleased with the outlook for the future for that company. The company is negotiating a new franchise with the city with every prospect of its early enactment and in addition the railway has begun to come back, showing a profit on operation for December.

Mr. Webster is quoted in the *Fresno Republican* in part as follows:

The franchise ordinance to be considered by the City Commission is a pioneer in its field and is based, with certain modifications and alterations, to meet Fresno conditions and objections on the franchises as granted in Montreal, Cleveland, Cincinnati, Memphis and Boston to rehabilitate and assist the street railways.

We are out of the red for the first time. December showed an excess of revenue over expenses, amounting to nearly 6 per cent. and January, I am assured, will duplicate the feat. February is also starting out on the same upward curve, showing that the condition is not spasmodic but promisingly permanent.

The broad minded spirit of the business men, city officials and the public generally while we were seeking a way out of the crisis facing us has been instrumental in getting a solution that virtually assures us of ready support in the financial market.

We have an investment here of, say, \$2,000,000 and in the next five years may put in another \$1,000,000. When the people want to they can buy back the property for what the system has cost, as ascertained by the Railroad Commission's adjudication, less depreciation.

Key Route Plan Would Cut Trans-Bay Ferry Time

The San Francisco-Oakland Terminal Railway has applied to the heads of the departments of War, Commerce and the Navy, at Washington, D. C., for permission to extend its East Bay terminus to Goat Island. This, it is stated, would shorten the water trip by 1½ miles and would reduce the time on the ferry from twenty to ten minutes. The company would be willing, it is stated, to build whatever type of bridge government authorities require and in addition to the rail lines would provide a roadway to make the Goat Island terminal accessible to vehicular traffic.

The present fill would be extended as far as practicable and the terminal on the island would be built on the north side, where there are shoal waters that could readily be reclaimed for terminal purposes. The application expresses a willingness either to finance the entire project or to join with other transportation companies in a joint terminal program. The plan is, in principle, the same as that suggested by Admiral J. L. Jayne, formerly stationed at San Francisco as commandant of the Twelfth Naval District.

Service Suspended by Glasgow District Subway

In consequence of losses incurred in working, the directors of the Glasgow District Subway Company announced early February that their railway will be closed until further notice. This subway, which was opened for traffic in the end of last century, forms a closed circle about 6 miles in circumference. The eastern part of the circle passes through the heart of Glasgow and the western part through Govan and Partick, while the other parts traverse the northern and southern districts of the city. The line passes twice under River Clyde.

Cable traction has been used all along, and with the exception of one or two short steep grade lines, and of the Edinburgh tramways (now being electrified) the undertaking is the only remaining example of cable traction in Great Britain. Since the Glasgow tramways were electrified the subway has suffered much from their competition, and the present period of trade depression has added to its troubles.

The Glasgow Town Council later took alarm at the prospect of the subway being closed because adoption of that course would inconvenience many people and would be likely to add to the congestion of tramway traffic during

the busy morning and evening hours. A special meeting of the Town Council was accordingly held on Feb. 9, when after deliberation in private a resolution was adopted remitting to a special committee to adjust the terms of an arrangement for keeping the subway going for not more than two months. During that period the committee is to confer with the directors of the subway company and to report where, in the public interest, the Town Council should acquire the district subway undertaking.

Co-operation Seen Between Managements and Men

"Fares, Hootch, Craps and the Unemployed" is the title of an interesting eight-page pamphlet recently circulated among the employees of the Georgia Railway & Power Company, Atlanta, Ga., by means of a joint effort on the part of the local Amalgamated division and the company. The pamphlet contains a reprint of two articles which were taken from the *Union Leader*, an organ published in the interest of organized labor by the Amalgamated Association of Street and Electric Railway Employees of America. One is a card of warning published over the signatures of officers of division 241, the body which holds the 14,000 surface and elevated railway men of Chicago; the other is an editorial along similar lines. The text of the booklet shows the Twentieth Century attitude of the railway managements and the Amalgamated divisions in contrast to the old-time relationship.

Another instance of this co-operation idea existing between management and men is found in the boosting program which has become the order of the day in Alliance, Ohio. The local division of the Amalgamated Association here insists that there is nothing better than boosting. As a practical demonstration of its views this division started in January the publication of a monthly leaflet entitled *The Booster*. The aim will be to boost along the Stark Electric Railroad and the Cleveland, Alliance & Mahoning Valley Railroad, the two companies employing members of this division.

Interchange Track for Public

The California Railroad Commission on Feb. 20 ordered the Central California Traction Company to permit cars of the San Francisco-Sacramento Railroad to be switched over an interchange track owned by the former company in the city of Sacramento. The switching service has been performed by the Sacramento Northern which was notified by the Central California Traction Company to discontinue handling cars of the San Francisco-Sacramento Company over the track. The latter company appealed to the commission for a restraining order against excluding it from the use of this track. In granting the restraining order the commission held that the track in question had been dedicated to public use.

Gas Case Appealed

Company at Atlanta Considers Questions of Law Involved to Be Vital Issues

The Georgia Railway & Power Company, Atlanta, Ga., maintaining that its rights under the Constitution of the United States had been violated by the Georgia Railroad Commission, which on Dec. 31, 1921 reduced the gas rate charged in Atlanta, has appealed its case to the Supreme Court of the United States, with the permission of the United States Circuit Court which recently upheld the decision of the State Railroad Commission.

In granting the appeal, Judge Sibley of the Circuit Court, orders the Georgia Railway & Power Company to post a bond of \$100,000 until such time as the case may be decided by the Supreme Court. In the meantime the court grants a writ of supersedeas which will hold all gas rates at their present level. The court also orders that, if the case is decided against the power company, the power company shall at such time pay back all extra charges that have been collected.

RAILWAY LISTS ITS REASONS FOR APPEAL

The company bases its appeal on sixteen assignments of error, the more important of which are stated briefly as follows:

1. Because the valuation of the property of the company, as established by the commission, was \$2,500,000 under the true valuation, and the lower valuation limits the company from earning a fair return on its property.
2. Because the court failed to find for itself a proper valuation.
3. Because the court, in fixing the value of the property, denied the right of the power company to assign a value to its franchise which is assessed and on which the company must pay ad valorem taxes, thus subjecting this particular part of the company's property without due process of law to the public use without permitting the company to earn any return thereon.
4. Because the court denied the company a sufficient working capital, and denied the right of the power company to amortize debts and losses amounting to more than \$1,000,000 which the complainants were forced to sustain during the years 1917 to 1920.
5. Because of grossly incorrect rates fixed and enforced by the commission.
6. Because the court, in fixing a fair value of the company's property, refused to consider the element of original cost of financing which amounted to more than \$500,000.
7. Because the court did not allow sufficient value for "going concern value."
8. Because the court held 2 per cent a fair depreciation rate, while the company claims a 2½ per cent depreciation.
9. Because sufficient depreciation has not been allowed since 1914.
10. Because the rate of 1.55 will return a yield of only 5.1 per cent on the valuation of the property, instead of 8 per cent as allowed under the rules of the Georgia Railway Commission.
11. Because the rates as established are confiscatory.
12. Because the court refused to allow sufficient value for increase in the value of the company's property since 1914.

It is claimed that in all of the above respects the decision contravenes the Fourteenth Amendment of the Constitution of the United States.

President Arkwright of the Power Company in summing up the company's appeal says:

There are questions of law involved in the case which are vital, and it is to the interest of the public and the company that these questions be finally determined by the United States Supreme Court.

The case was referred to in the *ELECTRIC RAILWAY JOURNAL* for Feb. 11, page 256.

East End Extension Being Agitated Again

Petitions calling for a special election on an initiative ordinance compelling the Cincinnati (Ohio) Traction Company to extend the East End car line to California are being circulated by the California Improvement Association as the result of a resolution adopted by the association. Announcement that the receiver for the Interurban Railway & Terminal Company operating through California would cease service March 25 and that the tracks would be torn up within sixty days were causes of the determination again to attempt to pass the ordinance by a vote of the people. The Public Utilities Commission has granted the Interurban Railway & Terminal Company the right to abandon its route between Cincinnati and California. Under a recent ruling of the Ohio Supreme Court a special election on the question is legal if held ninety days prior to the general election. The car extension issue failed at two previous regular elections.

Changes Proposed in New York Transit Law

An amendment to the public service commissions law to confine to such New York city traction companies as are included in the Transit Commission's plan of readjustment the power to authorize a change in the rate of fare previously fixed by contract, franchise or otherwise was incorporated in bills introduced in the Legislature on Feb. 27 by Senator William T. Simpson and Assemblyman George N. Jesse, both Republicans of New York. The amendment was recommended by the Transit Commission.

Three other amendments also are embodied in the measure. One seeks to give the commission power to compel continued through operation over all existing lines in New York City, with a view of meeting any possibility of service being broken or discontinued on any parts of the line of the Manhattan Elevated Railway Company.

Another is intended to make it clear that the valuations finally determined by the commission, "and incorporated in the contracts," shall be the basis for all allowances to be made to the railway companies and for fixing the returns "under the plan and the contracts entered into thereunder."

The fourth amendment authorizes and legalizes a proposed plan to give the commission power to organize the various operating companies, to permit their organization with a nominal capital stock and to enable the directors of the operating companies to be chosen by bondholders and others than stockholders. The amendment also provides for the detailed mechanism of incorporating these companies following in general the present provisions of the railroad law.

Subway Agitation Renewal in Chicago

Chicago may make a start on subways in the near future. Stirred by public agitation, the local transportation committee of the City Council on Feb. 22 named a board of engineers, to submit plans for an initial subway within sixty days. These engineers are: Bion J. Arnold, Harold Almert, R. F. Kelker, Jr., Joseph H. Pryor and Charles E. Fox.

Chairman Schwartz announced on behalf of the committee that plans would be prepared and if the surface and elevated companies are unwilling to co-operate an independent system may be started. Expenses can be paid out of the traction fund which now amounts to about \$30,000,000. It was decided to follow as closely as possible the suggestions made in the Parsons-Arnold-Ridgway report of 1916. It has been estimated that a two-track subway for elevated trains can be built from Eighteenth Street to Chicago Avenue for about \$10,350,000 and a subway for surface cars through the downtown district for \$7,181,750.

Up to date the present companies have not seen their way clear to co-operate with the city on the subway suggestions.

According to the latest report filed by the Surface Lines with the Illinois Commerce Commission, the revenue from passengers for the year ended Jan. 31, 1922, amounted to \$59,706,412, which after deductions left a return of 6.5 per cent on the purchase price. Revenue passengers carried were 750,515,622. The company's annual report will not be issued for several weeks.

New Suburban Service Established

The Columbus Railway, Power & Light Company, Columbus, Ohio, has made come true the dream of the dwellers in Columbus' northern suburban district, known as Clintonville. On Sunday, Feb. 26, it began a regular service from downtown to the suburban district, covering the 4 miles, through the congested business district and on through residence and suburban streets to the northern terminus, recently annexed to the city. Ten-minute service is being provided.

For a decade or more Clintonvillites have longed and prayed and worked for city railway service. They have it now and are duly appreciative. Sunday was a holiday in the real sense for them.

The run to Clintonville is being made over the Summit and Steelton line, which passes through the downtown section of Columbus on Third Street.

Saturday afternoon a party of company officials, City Councilmen, Mayor James J. Thomas and others made the first trip over the line to the northern suburb. The trip was extended to Worthington, a few miles north of the suburb, just to make the event one of interest to the village as well as to the suburb.

Western Pacific Plans to Take Over Additional Lines of Sacramento Northern

At a special meeting of the stockholders of the Western Pacific Railroad Corporation held at Wilmington, Del., on Feb. 20, a proposal was unanimously approved, it was announced, for the issuing of first mortgage bonds of the Western Pacific Railroad for the purchase of additional lines of the Sacramento Northern Railroad, consisting of electric lines connecting with the main line of the Western Pacific.

The electric railways and the other properties of the Sacramento Northern are to be conveyed to the Sacramento Northern Railway, and the securities representing them are to be all the authorized capital stock of the Sacramento Northern Railway or all the capital stock except shares necessary to qualify directors and all of the outstanding mortgage bonds of the Sacramento Northern Railroad, or not less than approximately \$5,165,000, the principal amount. The proposed payment for the purchase of the electric lines will exceed \$1,000,000.

A second proposal was approved for the authentication of first mortgage bonds of the Western Pacific Railroad for the construction or extension of a line from Woodland to Vacaville, Cal., to a connection with the existing line from Vacaville to Willota, and through to Vallejo, if it is desired or deemed advisable by the board of directors.

The cost will exceed \$1,000,000.

Traction Plan for New Development Before Council

The Evanston (Ill.) Street Railway has submitted a proposal to the City Council which includes transportation facilities for the west side of the city. The new west side line would be operated under the name of the Evanston West Side Railway, which later could be merged with the Evanston Street Railway. The company has sought the following concessions from the Council:

1. Granting of a twenty year franchise to the Evanston West Side Railway.
2. Extension of the franchise of the Evanston Railway for eleven years to correspond with the franchise of the new company.
3. Freedom from bus and jitney competition.
4. Freedom from paving streets on new west side lines until such lines are paying expenses and a profit.

Further Attacks Made on King Tax Measure

Another California railroad has taken exception to the constitutionality of the King tax bill, adopted at the last session of the State Legislature. On Feb. 18 in the State Superior Court the Los Angeles and Salt Lake Railroad (Union Pacific System) brought suit through its attorneys, the plaintiffs demanding a return of \$127,000, taxes paid under protest. The King tax bill was instituted and passed by the legislature to raise \$15,000,000 additional taxes from public utilities of the State

for conducting the State government. The legislative act provided that the steam road lines pay, under the new measure, 7½ per cent of their gross income into the State, whereas the old State corporation tax law carried a rate of 5½ per cent of the gross.

A number of suits attacking the constitutionality of the new measure, which exempted street railways from increased taxation, have been filed by various utilities. The street railways still pay 5½ per cent of the gross income as taxes. Other utilities have paid the added tax and have been permitted to increase their rates to consumers accordingly.

This tax measure applies to all forms of public utilities, but exempts municipally owned power, water, light and street railway properties from any taxes. It has been referred to previously in the ELECTRIC RAILWAY JOURNAL.

City to Hold Lien on Property

In order that Main Street may be paved—the work being held up because of the inability of the Jacksonville (Fla.) Traction Company to raise the money for its share—the city of Jacksonville will go ahead on the paper of the company, which is in receivership. The City Commission has authorized City Attorney P. H. Odom to take the necessary steps, in conjunction with Receiver E. J. Triay, to raise the \$30,000 necessary for the company's share, the city in turn to hold a lien on the company's physical properties until the paper is paid up by the company. Ways and means are to be worked out by the attorney and the receiver and reported back to the commission for approval.



News Notes

Official Figures Published.—Official figures announced by the Ontario government, Canada, show that Thorold township returned an adverse vote on the by-law to acquire the Niagara, St. Catharines & Toronto Railway. This means four of the seventeen municipalities rejected the proposal.

One-Man Cars Allowed.—The Board of Aldermen of the city of Providence, R. I., at its annual meeting on Feb. 16 changed the ordinance relative to the operation of electric railways which required trolley cars carrying passengers to be under the control of two men. The amendment will permit the use of one-man cars by the United Electric Railways Company.

Council Adopts Franchises.—The City Council of Dubuque, Iowa, recently passed the railway and lighting franchises of the Dubuque Electric Company. The measures will be submitted to a public vote at the spring election on March 27. A twenty-five-year ex-

tension has been sought by the railway, which officials claim is necessary to enable the company to market its securities and make improvements in service.

Free Official Rides to be Listed.—Mayor Julian M. Smith of Augusta, Ga., has asked for a list of all city officials who rode free on lines of the Augusta-Aiken Railway & Electric Corporation of South Carolina, Augusta, Ga. According to a statement of the general manager of the company, city officers rode more than 36,000 times in 1921 at the expense of the railway.

Legislative Bodies Approve Appropriation.—The New Jersey House of Assembly and the Senate have passed the Evans' bill to appropriate \$25,000 for the Board of Public Utility Commissioners to oppose the attempt of the Public Service Railway to make permanent the 8-cent fare which the company was authorized to charge temporarily by the Federal Court.

Agreement Effected.—Arrangements have been completed whereby the Cincinnati (Ohio) Traction Company is to make up any deficit of the Fairview Incline Company, caused by the operation of the incline. In consideration of this agreement the incline company is to honor the traction company's transfers, so that passengers will not have to pay an additional fare to use the incline. The contract is to be in force until Jan. 1, 1923.

Railway and Bus Clash.—Competition has started between the motor bus line and the Cleveland, Southwestern & Columbus Railway, which runs between Bucyrus and Galion. The fare charged by the railway and the bus is the same, 20 cents, but the electric line has asked the County Commissioners to change its franchise so as to permit a rate of 3 cents per mile. The distance is 11 miles with a brick road paralleling the interurban for the entire distance.

Self-Propelled Motor Car Replaces Trolley.—The Cape Fear Railways, Inc., as purchaser of the properties of the Cumberland Railway & Power Company, Raleigh, N. C., is engaged in completing a gasoline-propelled transportation system of 20 miles running from Massey Hill south to Fayetteville, through Fayetteville and westward to Camp Bragg. The company plans to construct 5 miles of additional track over which it is intended to operate gasoline-propelled rolling stock.

Wages Reduced.—The Sacramento Northern Railroad, operating in Chico, Cal., announced on Feb. 22 a wage reduction of 5 cents an hour for motormen and conductors in the interurban passenger service and a reduction of 7½ cents an hour for motormen and conductors in the freight service, effective Feb. 16. The wages of brakemen and Sacramento street car employees are not affected. Under the new schedule the passenger service men will receive 57½ cents an hour and freight men 62½ cents. The reduction, it was announced, is in keeping with general business conditions at present.

Financial and Corporate

P. R. T. Net \$1,807,292

Outlook for 1922 Particularly Bright, with Prospect Ahead for Resumption of Dividend Payments

The net income of the Philadelphia (Pa.) Rapid Transit Company in 1921 was \$1,807,292. This compares with \$382,065 in 1920. W. C. Dunbar, vice-president, explains that in accordance with the published policy and program for 1921, the net income of \$1,807,292 was spent to improve the condition of the property. Deferred maintenance, due to wartime conditions, was overcome during the year, and the reserve

ample to pay present rentals to underlying companies and 6 per cent upon the \$30,000,000 of Philadelphia Rapid Transit paid-in capital.

Expert testimony has been presented, according to Mr. Dunbar, showing that the accomplishments of men and management represent an annual saving to the car riders of over \$16,000,000. According to Mr. Dunbar nothing less than a 10-cent fare would have been required, had only ordinary operating methods prevailed.

The earnings, efficiencies and economies effected by co-operative effort are summarized by Mr. Dunbar as follows:

Passenger receipts approximating \$7,000,000, induced by superior salesmanship—producing a net revenue of.....	\$2,400,000
Advertising receipts attributable to better marketing of available space.....	300,000
Saving in operating costs due to scientific car scheduling and routing and increased speed aided by skip stop.....	8,350,000
Increased energy production per unit of fuel consumed and saving in power demand account lighter weight of nearside cars.....	1,800,000
Accident prevention work and enlightened policy of claim settlements.....	1,500,000
Developed production in car repair shops, refinements in methods of painting and maintenance of car bodies and equipment.....	900,000
Accelerated track relaying and repair.....	140,000
Improved fare collection and station methods on subway elevated.....	210,000
Benefits derived from low ratio of labor turnover.....	160,000
Savings account bulk purchases, standardization and reduced handling of supplies.....	260,000
Reduction in fire insurance premium rate in recognition of improved housekeeping and fire prevention methods.....	100,000
	\$16,120,000

fund for renewals re-established at \$1,671,679 as against the amount of \$1,500,000 set up in 1911.

Mr. Dunbar says that critics for the city assert that the present upkeep appropriations are too high, and other critics contend that they are too low but that Charles Hansel and George W. Fuller, eminent engineers who have spent two years in examining the property, have certified that the property is maintained in an appropriate operating condition and that present appropriations are necessary to maintain its present condition.

According to Mr. Dunbar, Philadelphia Rapid Transit's annual net earning capacity, with present wage reductions, now approximates \$3,000,000, after paying all operating expenses, fixed charges and taxes. This will provide \$1,800,000 for the proposed 6 per cent dividend on Philadelphia Rapid Transit stock, leaving upwards of \$1,000,000 otherwise applicable to payment of back dividends, which must now be used to finance expenditures for betterments and improvements. There is no other source from which to draw, until Philadelphia Rapid Transit's credit, made worth-while by continued payment of dividends, is sufficiently established to make Philadelphia Rapid Transit's guarantee good, so that track extensions and other additions to property may be thereafter financed under the terms of the 1907 city agreement.

Mr. Dunbar says that Philadelphia Rapid Transit's proved property value, before Public Service Commission, is sufficient to insure a continued return,

Only 1,606 suits against the company are now pending for unsettled accidents, as against 4,953 unsettled suits inherited in 1911 from former management. In 1921 2.55 per cent of operating revenue was required for accident costs, as against 6.21 per cent required in 1910.

Fixed charges now represent only 23.27 per cent of operating revenue, while 46.27 per cent was required in 1910.

INCOME ACCOUNT OF PHILADELPHIA RAPID TRANSIT COMPANY			
	1921	1920	
Gross passenger earnings....	\$41,514,830	\$37,989,623	
Other operating revenue....	905,775	817,731	
Railway operating revenue	42,420,605	38,807,354	
Way and structures and equipment—maintenance, renewals and depreciation	8,136,800	5,595,600	
Power — maintenance, renewals and depreciation	3,675,788	3,728,027	
Conducting transportation..	13,330,470	13,748,926	
General.....	3,291,709	3,521,358	
Taxes, including paving tax..	2,798,820	2,601,252	
	31,233,589	29,195,165	
Operating income.....	11,187,016	9,612,188	
Non-operating income.....	490,434	592,986	
	11,677,451	10,205,175	
Interest.....	1,029,245	976,462	
Rentals.....	8,720,913	8,726,647	
Sinking fund—city contract	120,000	120,000	
	9,870,158	9,823,110	
Net income.....	\$1,807,292	\$382,065	

President Mitten of the company reviews the controversy for control, to which reference has been made previously in the *ELECTRIC RAILWAY JOURNAL*, saying that a dividend of 6 per cent for 1922, with present earnings, is

assured, unless prevented by disruption of the present effective combination of men and management. He says that in the eleven years that followed 1911-1921 the company earned a surplus of \$11,595,494. Of this total \$5,846,514 has been paid in dividends and \$5,748,980 has been put back into the property. According to Mr. Mitten, Philadelphia Rapid Transit stockholders have been enriched by new values, created by co-operation of men and management, "who have thus earned the right to demand that the result of their co-operative effort be not destroyed, nor the management changed to endanger the continuation of their forward progress." He explains that the payment to Philadelphia Rapid Transit employees for super co-operation during 1922 is proposed, in an amount not to exceed 10 per cent of Philadelphia Rapid Transit payroll, after paying 6 per cent dividends to stockholders.

Mr. Mitten says that his agreement covering the direction of Philadelphia Rapid Transit affairs, unchanged since 1911, expires March 31, 1922, and will be continued, providing Philadelphia Rapid Transit stockholders assent to the proposed financial participation by employees in the result of further co-operative accomplishment.

Commission Approves Partial Abandonment

The Public Service Commission of New York has approved a declaration of abandonment by the International Railway, Buffalo, of a part of its old Buffalo-Niagara Falls line. The part to be abandoned is between North Tonawanda and LaSalle in the town of Wheatfield. The company is ordered, however, to arrange for the protection of the rights and equities of the holders of certain bonds issued under a mortgage by executing a trust agreement to contain specified conditions. The railway has agreed to make certain improvements on the old Buffalo-Niagara Falls line, thereby increasing the value of the road continued in operation.

The line abandoned is 7.12 miles in length. The company claimed there was little necessity for the old Buffalo-Niagara Falls line as the new high-speed line between the cities serves all purposes. The operating loss on the line in 1920 was \$86,108 and for the first six months of 1921 it was \$65,557.

Ottawa Traction Makes Report

In the eighth annual report of the Ottawa (Ont.) Traction Company Ltd., T. Ahearn, president, states that the amount received from The Ottawa Electric Railway during the year ended Dec. 31, 1921, was \$279,060. He said that this amount paid for the usual quarterly dividends of 1 per cent and a bonus of 1 per cent. The efficient condition of the railway's plant and equipment was made a subject for comment in the report.

\$116,462 Deficit for Chicago-Kankakee Line

The annual statement of the Chicago & Interurban Traction Company, Chicago, Ill., which operates from Chicago to Kankakee, showed a net deficit of \$116,462 for the year ended Dec. 31, 1921, as compared with a net deficit of \$37,701 in 1920. The net operating loss for the year, of \$1,844, is compared with net operating revenue of \$62,138 in 1920 before interest and taxes. The gross revenue from transportation was \$373,607 as compared with \$444,537 in the previous year.

	Dec. 31, 1921.	Dec. 31, 1920.
Revenue from transportation	\$373,606	\$444,537
Other revenue	36,770	5,345
Total	\$410,376	\$449,882
Operating expenses ..	412,221	387,743
Net operating revenue	\$ 1,844	\$ 62,138
Interest and taxes	114,618	99,840
Deficit	\$116,462	\$ 37,701

Details of the statement for the year ended Dec. 31, 1921, as compared with the previous year, are shown in table above.

Back Dividend Payments Liquidated

The Federal Light & Traction Company, New York, N. Y., has issued a circular to its stockholders in connection with the readjustment of its finances and the stock dividend of \$42 a share on its preferred stock which has just been declared.

New certificates for the number of shares of preferred stock represented by certificates which are surrendered bear substantially the following statement:

The accumulated dividends from Sept. 1, 1914, to Sept. 1, 1921, on the stock represented by this certificate have been paid in preferred stock (6 per cent cumulative) which has been accepted by the holder of said stock in satisfaction of said accumulated dividends. All certificates issued upon transfer of the stock represented by this certificate will bear this statement.

No certificate will be issued for a fractional share, but scrip will be issued for such fractional shares as may be required. Scrip for fractional shares will not bear dividends, but all accrued dividends when, as and if declared, are payable on the stock represented by scrip will be payable to the first registered holder of the stock.

The Dec. 1, 1921, quarterly dividend of \$1.50 a share has been declared payable on March 11, 1922, to preferred stockholders of record at the close of business on March 6. It will be paid on the 25,000 shares of preferred stock now outstanding. This method of payment has been adopted for the convenience of stockholders who receive the preferred stock dividend.

It is the desire and intention of the directors that the preferred stock issued in payment of the stock dividend shall participate in the March 1, 1922, quarterly dividend, but the board has advised that dividends should not be

declared except on outstanding stock. The board therefore has decided to defer the declaration of the March 1, 1922 quarterly dividend until after March 15, 1922, in order to enable the holders of the preferred stock to receive their stock dividend before the March 1, 1922, dividend is declared. The preferred stockholders are therefore urged to surrender their certificates promptly so that the March 1, 1922 quarterly dividend may be paid at the earliest possible date.

Columbus Property Extended

The Columbus Railway, Power & Light Company, Columbus, Ohio, with the approval of the State Utilities Commission has recently acquired by purchase from the Columbus, Delaware & Marion Electric Company more than 6 miles of its track from Summit and Hudson Streets in the north end of Columbus, on northward to and through the village of Worthington. This purchase has solved a problem that has existed for some time due to the fast residential development in the north end of the city which is spreading to Worthington. The Columbus, Delaware & Marion continues an operating privilege until it may within a stated time complete a new line for the same distance, which more isolated, will permit it to quicken time—the matter of time being an important factor with the interurban line between this city and Marion.

\$29,033,000 Louisville Railway Value

In his remarks to stockholders in presenting the annual report of the company for 1921 James P. Barnes, president of the Louisville Railway, reminded the stockholders that at the time of last year's meeting they were notified that the board of directors had engaged the J. G. White Engineering Corporation to make an appraisal of the physical properties of the company and estimate the cost of reproduction. This work was started on Feb. 25, 1921. Sometime later the city of Louisville appointed an expert, David C. Caldwell, consulting engineer, of Wilmette, Illinois, to make a similar appraisal for the use of the city in the fare proceedings or negotiations with this company.

Mr. Barnes said that the J. G. White Engineering Corporation's report of appraisal was presented on Nov. 1, 1921. It covered a very thorough and complete analysis of the company's property in the city system. The cost to reproduce the Louisville Railways urban property as of April 1, 1921, was found by the J. G. White Engineering Corporation to be \$29,033,900. Mr. Barnes said these data are now in shape to be used in presenting the claims of the company for a fair rate of return before a court or special master, or as a basis for negotiation and discussion of these matters with the proper authorities.

Engineer Recommends Abandonment of Twenty-Six Surface Lines

Recommendation that twenty-six of Brooklyn's seventy-one surface car lines be abandoned, some of them to be absorbed in part by surviving lines, was made on March 1 to the New York Transit Commission in a tentative re-routing report made by Daniel L. Turner, consulting engineer of the Commission. A public hearing on the plan will be held on March 6.

Among the more important lines it is planned to drop are the Myrtle Avenue, Sixty-fifth Street-Bay Ridge, Reid Avenue, Smith Street and St. Johns Place lines. In most instances the plan points out that considerable stretches of the abandoned systems can be taken over by other lines.

The tentative rerouting plan thus provides for the utilization of about 356 of the present 504 miles of track in Brooklyn streets. Of the 148 miles to be dropped entirely, 30 are now out of operation.

The plan says that "the function of the surface car systems in Brooklyn and Queens in the future, to a greater and greater degree, will be to provide for the local travel within the boroughs themselves, and to supplement and feed the rapid transit lines—not compete with them. In outlying sections of Brooklyn, where existing surface lines are not retained, bus lines should be established along such routes as will best feed the rapid transit lines."

In commenting on the plan, Chairman George McAneny said:

These recommendations will be consulted by the commission through its further examination of this matter publicly. Any definite action taken in the matter of re-routing will follow the plans and will be made subject to proper hearings, at which everybody will have an opportunity to be heard.

This report, however, and the preceding reports on the same subjects, covering Manhattan, are extremely valuable in the view of the commission and will approximate, at least, the action that in our judgment should finally be taken.

York Railways Income Decreases \$29,600

A decrease of \$29,600 in the net income of the York (Pa.) Railways for the year ended Nov. 30, 1921, as compared with the net income for 1920, is reported by Gordon Campbell, president, in his annual report. Net income for 1921 is \$207,001 and for 1920 \$236,602. While operating expenses remained practically the same, gross receipts from railway operation decreased \$55,376. Taxes increased \$7,211 over 1920.

	1921	1920
Gross earnings	\$1,720,417	\$1,679,122
Operating expenses ..	1,161,654	1,097,205
Taxes	122,471	115,260
	1,284,125	1,212,465
Net earnings	436,291	466,657
Interest and bond		
Discount	229,290	230,055
	\$ 207,001	\$ 236,602

The comparative income statement as shown in the table above includes both railway and lighting operation.

Toledo Has Best Month

Operation Cost Down to Finer Point than Ever Before, Says Railway Commissioner

Operations of the Community Traction Company, Toledo, Ohio, for January, the twelfth month under service at cost, returned a surplus of \$6,519 over all expenses and payments to funds. This is the best month's showing since the new ordinance has been in effect. Street Railway Commissioner W. E. Cann declared that the elimination of part of the bus competition had been largely responsible for the good showing.

During January both net earnings and gross receipts showed decreases from December figures, but the ratio of operating expense to gross income showed a decrease also of 2.45 per cent. Passenger revenue decreased 0.91 cents per car-mile, while operating expense was cut 1.61 cents per car-mile. Car mileage was cut 0.137 per cent. A total of 5,103,295 passengers were carried, of which 4,966,786 were revenue passengers.

During January \$35,000 was credited to maintenance and repair fund, the ordinance requirements as to depreciation and sinking funds were complied with and \$16,000 was set aside for taxes.

There is now a deficit of \$318,516 in the stabilizing fund. Mr. Cann points out that this is less than the savings in fare that have been made to car riders in the first eleven months of operation.

At the end of January there was \$70,504 in the fund set up for tax payments. Payments totaling \$55,455 had been made during the month.

In his talk to members of the Chamber of Commerce at a noon luncheon one day during the week ended Feb. 25 Mr. Cann pointed out some of the accomplishments of the new street railway control during the year 1921. He said:

We started the cost-of-service ordinance under the most unfavorable conditions I have ever known. The fare for six months provided us with a deficit of \$350,000, but it put us on our toes on operation, and we now have operating costs down finer than in any previous experience that I have known. They are down to rock bottom, with the exception of what lowering can come through material and labor reductions.

The service has been improved. Last February we were operating 105.5 trips an hour, which was increased to 112 trips an hour in December. During rush hours we operated 106 trips an hour in February and 173 trips an hour in December.

Speed of cars has been increased from 8.3 m.p.h. in February to 9.44 m.p.h., in December. The rush hour speed has been increased from 8.43 m.p.h. to 9.38 m.p.h. Double loading has helped.

To indicate service control, I can say that out of 200 cars checked last week on the East Broadway line only four were more than two minutes of schedule. That is notwithstanding the fact that we have forty railroad crossings to contend with.

Mr. Cann showed that the railway industry is a home-city business. He said \$1,688,937 was paid in wages to the 1,250 employees of the company during the year, which amounted to 53.6 per cent of the entire revenues. At least 60 per cent of materials was

purchased in Toledo and part of the power cost went into Toledo labor and materials. At least 75 per cent of the total revenue was spent in Toledo.

He showed that the average fare was 6.68 cents, as compared with the average of 7.2 cents for all cities of more than 50,000 people excluding New York.

Wants Legislation for Company's Relief

Because of purported losses sustained by the Southern Pacific Company through the operation of its railway line in Salem, Ore., the management of the corporation has sent to the City Council of Salem a letter suggesting legislation which would tend to relieve the company of a part of its present financial burdens. The company urges the amendment of an ordinance providing for twenty-minute service on one of its longest lines to a thirty-minute schedule, exemption from the traction corporation from hard-surfacing any streets not paved at the present time, elimination of the ordinance requirement of a 72-lb. rail in favor of a 60-lb. rail, abandonment of what is known as the Summer Street line, and adoption by the Council of a resolution favoring a 6-cent cash fare, and a 54-cent fare when tickets are purchased in books of fifty.

Columbus Company to Pay Back Dividends

For the first time since the present management of the Columbus Railway, Power & Light Company, Columbus, Ohio, took charge, the utility is to pay dividends. This was announced during the week ended Feb. 25, concurrently with the filing of an application with the State Public Utilities Commission for authority to issue \$1,228,996 of preferred stock, representing accumulated and unpaid dividends covering the past four years.

At the same time it was made public that with the ensuing year the payment of dividends will be made in cash, a welcome novelty for stockholders. The proposed stock payments represent a dividend of 6 per cent, amounting to a total of \$392,376, on the company's Series A preferred stock, as of April 1, 1922, and of 5 per cent, or \$836,620, on Series B preferred, as of Feb. 1, 1922.

Issuance of preferred stock in lieu of cash dividends at this time is shown to be necessary because of the inability of the company to sell its capital stock economically during the past four years, and because it cannot hope to sell any stock at this time to procure the wherewithal to reimburse its treasury for capital expenditures unless the market value of its outstanding stocks shall be brought to par. To pay accumulated dividends in cash would militate against bringing its stock back to par, the application avers.

A surplus of \$2,067,350 in assets over liabilities is reported, as of Jan. 1, 1922.

Stone & Webster Properties Submit Report

Results of operation during 1921 compared with 1920 on the lines of the Eastern Texas Electric Company, El Paso Electric Company, Columbus Electric Company, Galveston-Houston Electric Company, Tampa Electric Company and Paducah Electric Company, all Stone & Webster properties are given in the following tables. The Tampa Electric Company had the largest balance for the year 1921.

EASTERN TEXAS ELECTRIC COMPANY BEAUMONT, TEX.

	1921	1920
Gross earnings.....	\$1,670,328	\$1,619,242
Operating expenses and taxes.....	1,097,530	1,009,676
Net earnings.....	\$572,798	\$609,566
Income from other sources.....	12,400	7,490
Balance.....	\$585,198	\$617,056
Interest and amortization charges.....	230,787	193,890

Balance for reserves, replacements and dividends..... \$354,410 \$423,165
†Income from Securities of Port Arthur Ice and Refrigerating Co.

EL PASO (TEX.) ELECTRIC COMPANY AND SUBSIDIARY COMPANIES

	1921	1920
Gross earnings.....	\$2,290,405	\$1,931,629
Operating expenses and taxes.....	1,592,236	1,327,170
Net earnings.....	\$698,168	\$604,458
Interest and amortization charges.....	158,318	113,481

Balance for reserves, replacements and dividends..... \$539,850 \$490,977

COLUMBUS (GA.) ELECTRIC COMPANY AND SUBSIDIARY COMPANIES.

	1921	1920
Gross earnings.....	\$1,807,298	\$1,547,353
Operating expenses and taxes.....	798,069	964,990
Net earnings.....	\$1,009,228	\$582,362
Interest and amortization charges.....	395,803	382,224

Balance for reserves, replacements and dividends..... \$613,425 \$200,137

GALVESTON-HOUSTON (TEX.) ELECTRIC CO.

	1921	1920
Gross earnings.....	\$3,679,867	\$3,808,952
Operating expenses and taxes.....	2,760,887	2,682,447
Net earnings.....	\$918,979	\$1,126,504
Interest and amortization charges.....	426,636	422,056

Balance for reserves, replacements and dividends..... \$492,343 \$704,448

TAMPA (FLA.) ELECTRIC COMPANY.

	1921	1920
Gross earnings.....	\$1,715,903	\$1,473,629
Operating expenses and taxes.....	1,027,525	914,935
Net earnings.....	\$688,378	\$558,694
Interest and amortization charges.....	52,494	52,498

Balance for reserves, replacements and dividends..... \$635,883 \$506,195

PADUCAH (KY.) ELECTRIC COMPANY.

	1921	1920
Gross earnings.....	\$529,886	\$483,569
Operating expenses and taxes.....	395,366	347,241
Net earnings.....	\$134,519	\$136,327
Interest and amortization charges.....	96,795	75,090

Balance for reserves, replacements and dividends..... \$37,723 \$61,237

Net Income Shows Net Decrease in Duluth

The Duluth-Superior Traction Company, Duluth, Minn., reports a total railway operating revenue for 1921 of \$1,777,330 against \$1,919,579 in 1920. The total railway operating expenses decreased from \$1,585,900 for the year 1920 to \$1,493,305 for the year just ended. The net income transferred to profit and loss amounted to \$28,587 against \$73,848, or a net decrease of 61.3 per cent. In submitting its yearly report to the stockholders, A. M. Robertson, president of the railway, said that the management realizes the necessity of continuing the present reduced service, and if possible devising new economies in operating costs, until an increase fare is permitted in the city of Duluth.

American Cities Collateral Sold

As the application of the committee representing 10 per cent of the preferred stockholders of the American Cities Company has been denied and the sale of the securities has been conducted which were pledged with the Whitney Central Bank & Trust Company, New Orleans, as collateral, it is not conjectured that any further effort will be made to block the reorganization plan of the bondholders of the American Cities Company. Each holder of an undeposited \$1,000 bond of the American Cities Company will now receive from \$450 to \$475 in cash unless the bondholders' committee can effect some other means of taking them on.

The depositing bondholders will receive new securities in the National Power & Light Company. For each \$1,000 bond, there will be given one \$500 7 per cent income bond; 2½ shares of preferred stock and 3½ shares of common stock in the National Power & Light Company.

The preferred stockholders will have the right for each twenty shares of American Cities preferred stock now held to subscribe for a \$100 7 per cent income bond and seven shares of common stock in the National Power & Light Company, upon payment of \$242.50 cash.

Twin City Earnings Amount to \$487,305

For the year ended Dec. 31, 1921, the Twin City Rapid Transit Company, Minneapolis, Minn., realized a total railway operating revenue of \$13,865,582 against \$12,986,406 for 1920. The earnings for 1921 after paying expenses and making allowances for depreciation and the payment of the quarterly dividends on the preferred stock at the rate of 7 per cent per annum amounted to \$487,305.

In his report to the stockholders dated Jan. 24, 1922, Horace Lowry, president of the property, told of some of the important work which had been accomplished during the year just ended. He said that the work of constructing front exits on 300 cars had

been completed and twenty-five cars of the company's older type had been converted into trailers which were being operated successfully. He said further that there had been developed a new two-car train having a seating capacity more than double the company's present standard double truck car. In his opinion the operation of such trains will increase the efficiency of the system and greatly improve transportation for the public.

Charlottesville Net Is \$42,097—Five-Cent Fare

A net surplus of \$42,097 for the year ending Dec. 31, 1921, of the Charlottesville & Albermarle Railway, Charlottesville, Va., is shown in the president's annual report. In 1920 the net surplus was \$24,021. The company operates at a 5-cent fare. The comparative statement follows:

	1921	1920
Gross earnings:		
Railway	\$ 72,657	\$ 60,226
Light and power	163,899	138,003
Total	\$236,556	\$198,229
Operating expenses:		
Railway	50,482	42,754
Light and power	68,679	67,999
Total	\$119,161	\$110,753
Net earnings	117,395	87,476
Fixed charges	37,633	35,499
Amount available for dividends	\$ 79,762	\$ 51,977
Dividends paid on preferred stock	8,589	8,589
	71,173	43,388
Miscellaneous income ..	1,424	633
Surplus	\$ 72,597	\$ 42,021
Depreciation	20,000	20,000
Income tax	10,500	
Total	\$ 30,500	\$ 20,000
Net surplus	\$ 42,097	\$ 24,021

Exceeds Authorized Return

The Dallas (Tex.) Railway exceeded its authorized return of 7 per cent on its invested capital during January, this year, according to a report filed in the office of John W. Everman, supervisor of public utilities. The report shows gross earnings of \$259,448 and gross operating costs of \$145,732, leaving a balance of \$115,716 for reserves and return on the invested capital. Deducting \$38,876 for reserves, as required by the franchise, a balance of \$56,840 is shown. The authorized return of 7 per cent on the invested capital amounts to \$54,764 which leaves an excess of \$2,076 for the surplus reserve. This amount is credited against the accumulated deficit in the authorized return, now amounting to nearly \$1,000,000.

San Francisco Municipal Line Has \$9,484 Surplus

The San Francisco (Cal.) Municipal Railways reports a net income for the month ended Dec. 31, 1921, of \$9,484. Receipts for December amounted to \$253,132, and total operating expenses climbed to \$178,017, leaving a total of \$75,115, before depreciation, compensation insurance fund and interest. These three items amounted to \$65,631, leaving a surplus of \$9,484 for the month.

Financial News Notes

Net Realized of \$74,346.—For the month of January, 1922, the Market Street Railway, San Francisco, Cal., reports a railway operating revenue of \$764,885 and a railway operating expense of \$579,612. The gross income amounted to \$138,017 from which deducting bond interest, etc., a net income remains of \$74,346.

Good Showing for January in Boston.—The total receipts of the Boston (Mass.) Elevated Railway for January, 1922, amounted to \$2,837,057 against \$2,930,072 for the same month a year ago. The total operating expenses were \$1,831,474 against \$2,062,146. The total "cost of service" for the month was \$2,633,783. The excess of "receipts" over "cost of service" was \$203,274, an increase of \$92,372 over January, 1921.

New Issue Offered.—Bonbright & Company, New York, N. Y., are offering \$1,000,000 of the Tri-City Railway & Light Company's first and refunding mortgage 5 per cent gold bonds. The bonds are dated July 1, 1910, and are due July 1, 1930. The price is 92 and accrued interest, yielding about 6.25 per cent. The Tri-City Railway has outstanding, including this issue, \$11,750,000.

Negotiations for Sale in Prospect.—It appears that negotiations have been completed for the sale of the defunct Norwalk-Shelby line to the Wilkoff Syndicate, Pittsburgh, Pa. A certified check of \$10,000 has been deposited with G. Ray Craig, Norwalk, master commissioner of the company. Formal approval of the sale by Federal Judge Killits is expected soon. Operation was suspended by the traction line last March.

Stock Issue Offered.—The Hagerstown & Frederick Railway operating in Cumberland, Md., has inaugurated a Community Partnership Policy, which is simply the extension to its customers and the public of a plan whereby they may become partners in the business. The company announces the issue of \$200,000 par value of its 7 per cent cumulative preferred stock at \$50 a share, which is the par value. It is the plan that this entire issue be taken by local people.

Suburban Road Sold Under Foreclosure.—The property of the Syracuse & Suburban Railroad, Syracuse, N. Y., was sold under foreclosure on Feb. 24 to I. D. Vann for \$10,000. Mr. Vann represented J. M. Steer of the Girard Trust Company, Philadelphia, chairman of the first mortgage bondholders' protective committee. The sale was made under proceedings brought by the Fidelity Trust Company, Philadelphia. The first mortgage due was for \$485,722 and the second mortgage \$150,000.

Traffic and Transportation

Experimental Fare Periods Extended

The Public Utilities Commission of Connecticut announced on Feb. 28 that the 5-cent fare would continue in Bridgeport until further orders. The commission's order for the ninety days test contained a provision for its continuance until the commission ordered otherwise. The period of the test expired on Feb. 20, but the 5-cent fare order continues in force. This applies equally to the rate of fare charged in Norwalk. Connecticut Company officials have stated that no tokens allowing for three rides for 25 cents would be sold for those two divisions as they are under the Public Utilities Board order as regards rate of fare.

Lower Fare in Prospect

Car riders in Cleveland, Ohio, will very likely have their car fare reduced early this coming summer, if the same gradual but steady improvement in business conditions that has been manifest for the past several months continues. That is just disclosed by the January report of the Cleveland Railway, read to the company directors on Feb. 23.

This report shows that the company in January earned a surplus of \$1,973 over and above all expenses. The deficit in the interest fund has now been reduced to \$87,061, and the grand total surplus in the company's operating reserve fund, including \$28,298 accumulated in January, is \$442,748. The company carried a total of 32,876,191 passengers in January, a slight increase over the previous month.

The company's fiscal year ended last month, at which time the surplus in the operating fund was transferred to the interest fund, giving the interest fund a surplus of more than \$350,000. The interest fund is the fare barometer, and when it contains \$700,000 the fare must automatically be reduced one notch.

Fare Referendum Will Not Be Submitted

No referendum on the question of a 5-cent fare with a tax levy to liquidate the resulting deficit in the Seattle (Wash.) Municipal Railway will be submitted to the voters of Seattle at the May election. Councilman C. B. Fitzgerald's measure, providing for such a referendum, was defeated in the Council recently by a vote of five to three.

One reason for the defeat of the ordinance was the decision of three Councilmen to vote against it, in order that Councilman Erickson's plan to load the entire cost of operation and maintenance of the railway upon the general fund should go to the voters

as a clear-cut issue, so that it may be defeated once and for all. The 5-cent fare referendum proposed by Councilman Fitzgerald would, it is believed, cloud the issue and leave the Erickson plan in the offing for another year, so that taxpayers and prospective taxpayers would not know whether to expect the 18 mills addition to the tax levy which it is estimated would result from the Erickson scheme.

Washington Fares Reduced

Slight Concession to Purchasers of Tokens Is Ordered by Commission—Legislative and Merger Program Failed

Effective March 1, the Public Utilities Commission of the District of Columbia reduced the rate of fare on the electric railways in the national capital from the present basis of five tokens for 35 cents to six tokens for 40 cents, but maintaining the present 8-cent cash fare.

ON JULY 29, 1921, the commission issued an order reducing fares on the lines in the District of Columbia from 8 cents cash, or four tokens for 30 cents, to 8 cents cash or five tokens for 35 cents, these rates to be effective until March 1, 1922, on which date they were to be restored automatically to those in effect on Oct. 18, 1919, unless on or before March 1, 1922, the commission should order otherwise.

On Jan. 12, 1922, the commission announced its intention of holding a public hearing to consider the question of the rates of fare to be effective on and after March 1, 1922, with particular reference to correlated operating subjects which it listed under nine different heads.

In its decision just rendered, the commission before proceeding to a discussion of the testimony given at the public hearings on these several questions on Feb. 1 and 2, 1922, says it felt it should state its position on the question of whether the rate of fare for all the companies in the District of Columbia should be uniform or whether each company should be considered separately and such a rate of fare established for it as will enable it to earn a fair and reasonable rate of return upon the fair value of its used and useful property. It was contended by both the Capital Traction Company and the Washington Railway & Electric Company, that the rate of fare should be uniform. It was contended with equal force by the representatives of the Federation of Citizens' Associations that, under the provisions of the public utilities act, the commission has no authority to consider these two companies as one and must establish separate rates of fare for each. The position which the commission took on Oct. 18, 1919, is in effect that the two systems are so related that if the

Witt Suggests Solution of Traffic Problem

In answer to the query of *The Press* as to the solution of the traffic problem in the Public Square of Cleveland, Ohio, Peter Witt, traffic expert, suggests a plan with the conveniences of loading and unloading at one place, immunity from traffic dangers and protection from storms when transferring. The three outstanding features of the plan are to keep vehicular traffic out of the Public Square altogether, prohibit parking there at any time, and loading all Square trolley traffic from one platform extending the length of Ontario Street through the Public Square with a sheltered inclosure in the center.

present character of service is to be maintained, much less improved, it is deemed imperative that uniform rates be maintained on the two systems.

At that time the commission said that it was true that the disparity in the net earnings of the two corporations is very great; that every proper means of correcting this disparity should be taken and that a big step toward this end lay in modifying the provisions of the law under which street railway companies are required

CAPITAL TRACTION COMPANY

Earned in excess of a 7 per cent return in 1919, actual	\$ 372,268
Earned in excess of a 7 per cent return in 1920, actual	536,016
Earned in excess of a 7 per cent return in 1921, actual	584,309
*Estimated earnings in excess of a 7 per cent return, 1922	517,479
	\$2,010,072

WASHINGTON RAILWAY & ELECTRIC COMPANY'S SYSTEM

Amount by which the combined companies failed to earn a 7 per cent return:	
Actual, 1919	\$ 780,444
Actual, 1920	401,919
Actual, 1921	121,761
*Estimated, 1922	458,553
	\$1,762,677

Net amount paid in excess of 7 per cent return on fair value of all companies \$ 247,394
*Estimates as made by companies, unchanged.
Returns are based upon weighted average fair value for each year, as found by the commission.

to pay into the public treasury 4 per cent of their gross revenues.

In carrying out its expressed intention to seek remedial legislation a bill was introduced in the House of Representatives on Jan. 25, 1920, the principal provisions of which contemplated a change in the method of taxation from the present 4 per cent tax on gross receipts to a tax of 50 per cent on net income in excess of 6 per cent return

and 75 per cent on net income in excess of 7 per cent return, with no tax if the net income is less than a 6 per cent return. Since that time twelve other bills have been introduced in the House of Representatives and five in the Senate, all seeking to provide some form of relief to the public from high fares.

REMEDIAL LEGISLATION FAILED

The remedial legislation has all failed and the effort also failed which was made to bring the two companies together in voluntary consolidation. Under the circumstances the commission felt that it should adhere to its position to keep the rates of fare uniform. Any other policy, it felt, would bankrupt the weaker carrier.

The effect of maintaining a uniform rate of fare for these two companies during the past three years, including the effect for the present year at the existing rates if this policy be continued, is shown by the commission on the preceding page.

The fair value of the properties of the Capital Traction Company and of the Washington Railway & Electric Company system, as of Dec. 31, 1921, was, respectively, \$15,865,798 and \$17,469,527, or a total of \$33,335,326, based upon the commission's findings. These figures included the net amounts of additional property placed in service during 1921, at the actual cost thereof. The commission says that in calculating the rate of return earned by each of these companies during that year the weighted average of the 1921 additions should be taken, not the full amount of such additions. This would reduce the fair value figures just given to an average fair value for each company of \$15,734,221 and \$17,236,409 respectively. On this basis the rate of return actually earned during 1921 becomes 10.73 per cent for the Capital Traction Company and 6.25 per cent for the Washington Railway & Electric Company system. If these two principal street railway companies be considered as one, their combined operations during the year 1921 will show a rate of return of 8.38 per cent upon the commission's findings of fair value.

COMPANY PROTESTED VALUATION

The commission says that these earnings are in excess of what may be expected in 1922, principally because the rate of fare during the first eight months of that year was higher than the present rate. The estimates for the two companies for 1922 at the present rates of fare show a rate of return on the fair values as of Dec. 31, 1921, of 10.26 per cent and 4.375 per cent, respectively, or a combined rate of return of 7.17 per cent. Expressed in dollars, this amounts to \$58,926.13 in excess of 7 per cent return on the combined fair value.

In the petition submitted by the Washington Railway & Electric Company at the opening of the case the company discussed the question of the fair value of its property as a basis for fixing rates. The position it took

then that the basis of the valuation was unfair was also discussed by the president of the company in his testimony, the claim being made that the cost of reproduction, using the commission's basis and quantities as of July 1, 1914, and using the present costs, shows that the property at this time would cost over \$10,110,606 more than the figures used by the commission. A similar claim was made at the hearing by the Capital Traction Company, the increase in the reproduction cost of that company's property, at this time being placed at about \$4,000,000. On this point the commission said:

The commission does not consider it necessary nor advisable to enter into a discussion of these claims at this time. It is sufficient to say that the trial court has upheld the findings of the commission in the Potomac Electric Power Company's case in every particular; the Court of Appeals has reversed the lower court on two points only, on one of which the companies now rely for their arguments for an increased fair value; an appeal has been taken from the latter decision to the United States Supreme Court, which that court has allowed, and briefs and transcripts of the evidence are being prepared for presentation to that court. The commission will await the decision of that court before attempting to revise its findings of fair value.

ESTIMATES FOR 1922 CONSIDERED

The commission in its finding then goes at considerable length into the estimates of the probable cost of operation for 1922, compares the rates of fare in effect in Washington with those charged in about seventy-five other cities, and concludes that "a reduction in the rate of fare is justified from the evidence in this case, and, after considering the effect on the revenues of the combined companies, reaches the conclusion that the token fare should be reduced from 7 cents to 6½ cents, the cash fare to remain unchanged and the present charge for intercompany transfers to continue."

Commission Requests Opposing Authorities in Rehearing Case

The California State Railroad Commission, with a view to examining again the principles governing rights of way lands and uniform mileage fares, has addressed a letter to city attorneys and special representatives of communities and organizations appearing in the case of the Pacific Electric Railway asking these parties to furnish briefs and citations on these subjects at the rehearing of the railway's case in Los Angeles on March 20, which was postponed from Feb. 24. The commission pointed out that while its recent rate and service decision regarding the Pacific Electric followed the law as it heretofore has been interpreted by the courts, it always stands ready to receive suggestions and hear arguments in support of other views.

The questions on which the commission specially asked for opposing authority were the consideration that should be given donated lands and bonuses and the fairness of allowing the same rate per miles on paying as on non-paying lines.

Authority of I. C. C. Over Intrastate Rates Upheld

Increased intrastate railroad rates put into effect in all States by the Interstate Commerce Commission during the last nine months were upheld by the United States Supreme Court on Feb. 27.

The court declared constitutional that part of the rate-making provisions of the Esch-Cummins law, which gave the Interstate Commerce Commission virtually complete control of the intrastate as well as interstate rates.

This provision of the law was attacked by forty-three States which claimed that their sovereign rights were invaded by the statute and that Congress had no authority to give the commission control over intrastate rates, but only over interstate matters.

The suit, the first legal attack against the Esch-Cummins Law to reach the Supreme Court, was brought by the Railroad Commission of Wisconsin against the Burlington Railroad to enjoin the charging of the higher rates.

The decision of the Supreme Court in this case is regarded as one of the most important that the Supreme Court has rendered in recent years. In brief, it means that the Commerce Commission has unlimited power to safeguard the revenues of interstate carriers from injurious action by state authorities through the fixing of local rates. It practically disposes of the issue of states' rights so far as the exercise of them may reduce railroad revenues below the level determined upon by the federal commission as reasonable.

NEW LEGISLATION PENDING

In previous decisions the Supreme Court had indicated that, while Congress undoubtedly had the power under the Constitution to pursue the protection of interstate commerce into the domain of the states if necessary, it had not exercised that power, except so far as direct discriminations in specific rates were concerned. In passing the transportation act, according to the theory of the railroads and the federal commission now upheld by the Supreme Court, the federal commission was given power not only to remove discriminations in specific rates, but also general discriminations against interstate commerce where only the question of the reasonableness or adequacy of the total revenue was concerned.

Legislation is pending in Congress, notably in the Capper bill, to amend the rate-making sections of the transportation act so as to restore jurisdiction over state rates to the state authorities, regardless of the effect upon the revenues of the carriers or the yield upon their property investment.

Increased Patronage Noted.—Electric railway patronage in Miami and Miami Beach (Fla.), for January, 1922, has increased 15 per cent over January, 1921, according to R. L. Ellis, manager of the Miami Beach Electric Company.

Rumor Weekly Pass May Be Adopted

The Tacoma Railway & Power Company, Tacoma, Wash., is considering the installation of the weekly pass system on its lines, similar to that in use in Youngstown, Ohio. This is indicated by the fact that the company recently sent Richard T. Sullivan, its manager, to Youngstown, to investigate and report on the success of the plan in that city. No confirmation or denial of the plan has been made by the Tacoma officials. However, a resolution has been introduced in the City Council, asking the Department of Public Works to request the Tacoma Railway & Power Company to establish a weekly pass to cost \$1, and to be good for an unlimited number of rides during the week. The resolution asks the department to do everything possible to get Tacoma fares down to franchise provisions. Mr. Sullivan is very likely conversant on conditions in Youngstown, being formerly general manager of the Mahoning & Shenango Railway & Light Company.

Another Small Company Gets By on Five Cents

Another small road has been able to get by on a 5-cent fare, during the trying war-time period. It was a terrible struggle, but the company has succeeded. The railway in question is the one at Hannibal, Mo., operated by the Hannibal Railway & Electric Company. Included in the system are 6.5 miles of track. The need of the company was great for increased revenue, and in its effort to preserve the full value of the service to the public the company in 1918 sought an advance in fares. After no end of delays the matter finally came before the Public Service Commission at a rehearing last December for determination. The railway, however, having struggled along in the meantime as best it could, withdrew its appeal for help, realizing that as the tendency everywhere was toward price recession, the stigma of seeking an advance in rates just at that time would attach to it, although it would be unfair to the company that this should be so.

The increase in fare sought in 1918 was from 5 cents to 6 cents, with a corresponding increase for half fares. After several months, the Public Service Commission, to which the appeal had been addressed, turned down the request. During the late summer of 1920 the commission sent its auditors and engineers to examine the plant. The final outcome was that in December, 1921, the commission granted a further hearing on the original request. During all of this time the company operated on a 5-cent fare. It is still doing so.

After looking at the matter from all angles the company decided to ask the commission to dismiss its request without prejudice. This the commission did. As stated before, the company was prompted to this action by the fact that it did not think it propitious to seek

an increase in fares when prices generally were on the downward trend. Moreover, as the company had been able, by exercising the greatest economy, to struggle along after a fashion, it figured that the prospect which was ahead of an early return to normal conditions removed the need for insisting on relief. The record is all the more remarkable when it is considered that the company is still running two-man cars and that the equipment necessarily is not the most efficient available to companies whose means permit them to adopt all that is best in modern methods of equipment and engineering.

Transportation News Notes

Repeal One-Man Car Ordinance.—The ordinance prohibiting the use of one-man cars in Sacramento, Cal., was repealed recently by a plurality of approximately 500 votes.

Pay-Leave Plan Suggested.—Collection of fares as passengers leave the car instead of when they enter is suggested as a means of relieving congestion on the lines in Camden, N. J., of the Public Service Railway by the trolley schedules committee of the Camden Chamber of Commerce.

Council Rejects Plan.—The plan of the Tri-City Railway, Davenport, Iowa, to install a monthly ticket system has been rejected by the City Council. This scheme of increasing individual fares to 10 cents and offering 5-cent fares to the holders of monthly tickets was discussed in the *ELECTRIC RAILWAY JOURNAL*, issue of Feb. 25.

Hearing Postponed.—The hearing on the 10-cent fare rate on the lines of the Grays Harbor Railway, Light & Power Company operating between Aberdeen and Hoquiam has been postponed until March 8. The hearing was set for March 1. Several weeks ago the 10-cent fare went into effect and has been the cause for considerable protest.

Planning to Expedite Ticket Sale.—The action of the Cincinnati (Ohio) Traction Company in discontinuing the sale of two tickets for 15 cents has brought forth protests from many citizens. Before the Street Railway Committee of the Chamber of Commerce, Walter A. Draper, vice-president of the traction company, presented data showing how the sale of tickets at the rate of two at a time impeded service. He said that the traction company was preparing plans whereby car tickets would be placed on sale in any store that may care to handle them.

One-Man Cars on Line to Lake.—One-man cars have been placed in service on the line of the Connecticut Company between Willimantic and Lake Coventry. After leaving Willimantic

the route of this line runs for the most part along the public highway. Except in the summer, when the lake is popular as a resort, the service between the two places over the single track line is infrequent. The road is divided into two zones, one furnishing service over the main street of Willimantic as far as Perkins Corners and the other extending from Perkins Corners to the lake.

Rehearing Postponed.—On Feb. 20 the California State Railroad Commission postponed to March 20 the Pacific Electric Railway's rehearing of the Hollywood rate case, which was scheduled to take place before the State Railroad Commission in Los Angeles on Feb. 24, 25 and 27. The postponement was caused by the serious illness of Paul J. Ost, assistant engineer of the San Francisco Municipal Railway, who has been called to represent the Hollywood Chamber of Commerce. The rehearing was granted the Hollywood Board of Trade, which is fighting the increase of the local fare to 10 cents on the Pacific Electric Lines serving its territory.

Scranton Rezoned.—The Scranton, Montrose & Binghamton Railway, Scranton, Pa., in a decision of the Public Service Commission dated Aug. 16, 1921, is ordered to rearrange its zoning system. The boundary of the first zone had been placed by the company at a point three-quarters of a mile from the boundary line of the city, where the zone had previously ended. To enable patrons living within the second zone, and thus within the city, to ride into the center of the city for one fare of 7 cents, the commission ordered that the limit of the first zone be extended to the city line.

Double-Berthing Plan in Effect.—The Dallas (Tex.) Railway is now employing the double-berthing plan of loading street cars in the business district of Dallas, as a means of speeding up traffic. This has just been made possible by the passage by the City Commission of an ordinance authorizing such practice. The ordinance was passed on recommendation of the Dallas Safety Council and with the approval of the officials of the railway. New safety zones range in length from 90 ft. to 125 ft. from the property line of the intersecting street, and will permit the berthing at the same time of two cars for loading and discharging passengers.

May Operate Trackless Trolleys.—Several trackless trolleys will be purchased by the International Railway Buffalo, N. Y., for operation on Bailey Avenue if the necessary franchise is secured from the municipal authorities. Residents in the Bailey Avenue section have approved of the offer of the traction company to operate trackless trolleys in that section instead of laying tracks in that newly developed residential district. The International Railway told residents of the section as represented in the Bailey-Kensington Business Men's Association that its financial condition is not such that it could go ahead with laying a double track line in Bailey Avenue until that section of the city is better developed.

Personal Mention

Promotions on Cleveland Railway

**R. W. Emerson Named General Manager
—A. E. Duty His Assistant—A. L.
Behner General Superintendent**

Promotions for three employees of the Cleveland (Ohio) Railway have just been announced by John J. Stanley, president, as a result of the recent death of George L. Radcliffe, vice-president and general manager of the company.

Ralph W. Emerson is named general manager. Since September, 1915, Mr. Emerson has been assistant superintendent of the company.

Mr. Emerson's experience in the traction field has been varied and rather unusual. Graduating in 1906 from Case School of Applied Science as a mechanical and electrical engineer, he joined the engineering force of the Cleveland Railway immediately thereafter. In 1910 he resigned from the service of this company to install and operate a power

as a motorman. Later he was transferred to the Cleveland, Southwestern & Columbus Railway. For a number of years he was very active in the work of the Amalgamated Association of Street & Electric Railway Employees of America as one of the international vice-presidents. On Nov. 1, 1910, he was appointed superintendent of employment for the Cleveland Railway, and became assistant general superintendent on Feb. 1, 1912.

Paul Warwick Is Executive Secretary of Georgia Utility Committee

Paul Warwick, assistant director of public relations for the Georgia Railway & Power Company the past few months, became executive secretary during February of the Georgia Committee on Public Utility Information. Mr. Warwick has been well known in newspaper circles in the Southern states for several

assistant director of public relations of the Georgia company by John R. Marsh, who has been connected with the editorial department of the *Georgian* in Atlanta for more than two years.

W. H. Taylor Assistant Executive

Appraisal and Rate Expert Joins Georgia Railway & Power Company

William H. Taylor, president for the past several years of the Omaha (Neb.) Gas Company, has joined the Georgia Railway & Power Company, Atlanta, as executive assistant to Preston S. Arkwright, president of the company, and Hugh M. Atkinson, chairman of the board of directors. He has become nationally known in public utility circles as an expert in appraisal and rate matters and in general consulting engineering work.

Mr. Taylor joined the Omaha Gas Company nine years ago as general manager of its properties, and seven years ago he became president of the company. Prior to that time he was with the United Gas Improvement Company, as engineer in charge of the gas



A. E. DUTY



A. L. BEHNER



R. W. EMERSON

plant of the New York & North Shore Traction Company at Roslyn, L. I., N. Y. When that road began operating he acted as general superintendent, continuing in that capacity until 1915, when he rejoined the Cleveland Railway. Mr. Emerson is thirty-seven years old.

A. E. Duty is advanced from the position of general superintendent of the Cleveland Railway to assistant general manager. Mr. Duty is sixty-nine years old. He has been actively connected with electric transportation in Cleveland for more than fifty years. For the past ten years he has been general superintendent of the Cleveland Railway. Word of his promotion was wired Mr. Duty at Pasadena, Cal., where he is spending the winter.

Arthur L. Behner is promoted to the position of general superintendent of the Cleveland Railway. He is known throughout the country in traction circles as "Al" Behner. Twenty years ago he entered the service of the company

years, having been connected with the *Atlanta Constitution* before and since the war as an editorial and feature writer. He served in the overseas forces during the war with the Eighty-second Division.

The Georgia committee was organized only last year and Lincoln K. Starr, now director of public relations for the Georgia Railway & Power Company, served as its first secretary. The purpose of the committee is to keep the public informed on matters pertaining to the public utilities throughout the State and to build good will for these utilities by the dispensing of reliable and accurate information concerning them and their operation. Among the plans it proposes to carry out this year is an extensive newspaper advertising campaign that is to serve an educational purpose in the building of public good will for the utilities of the State.

Mr. Warwick has been succeeded as

and electrical properties on the main line out of Philadelphia. He had previously served with the Fulton County Gas & Electric Company Gloversville, N. Y., for a period of three years, where he also was engaged in engineering work.

MR. TAYLOR KNOWN NATIONALLY

While president of the Omaha Gas Company, Mr. Taylor served on various committees for the National American Gas Association, and was also representative of the association in the Iowa district. He was also president at one time of the Iowa District Gas Association. The bulk of his work the past few years has been in connection with rate cases before commissions and courts either as a witness or as a rate and appraisal expert. His duties with the Georgia company will be of a general nature in that he will act as the personal representative of the chairman of the board and the president.

Mr. Taylor was graduated from the Stevens Institute of Technology at Hoboken, N. J., as a mechanical engineer in 1902.

W. F. Bellinger and A. L. Smith Head New Departments of Georgia Railway

Following the resignation recently of G. A. Iler, superintendent of operation in the electrical department of the Georgia Railway & Power Company, Atlanta, F. L. Butler, general operating manager, has divided this work into two separate departments and announces the appointment of W. F. Bellinger and A. L. Smith to take charge.

Mr. Bellinger, who has been assistant superintendent of operation, becomes general superintendent in the electrical department to have supervision of the commercial trouble men, load dispatchers and operators of all the stations of the company near Atlanta, and all stations in other cities. Mr. Smith, who has been superintendent of the substation construction and steam heating division, is made superintendent of tests and repairs. He will continue in charge of the other division and will also have supervision of the repair and testing departments.

W. C. Smith Retires from Penn- sylvania-Ohio Electric Company

W. C. Smith, for many years superintendent of the Newcastle District of the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, and manager of Cascade Park, has resigned. He does not expect to go into any other work.

Mr. Smith has been active in the railway industry for forty-two years. He has watched it grow from a city transportation by horse cars to an inter-urban transportation by electricity. He drove a horse car, but he acted also as conductor, and traffic manager as well if anything obstructed the peaceful path of the car. From 1880 to 1883 he successfully conveyed passengers for the Citizens' Passenger Railway Company of Pittsburgh in what was then record-breaking time. In 1883 he became stable chief and superintendent of the East End Division, and in 1889 assistant superintendent of the Citizens' Traction Company.

His experience includes direction of cable cars, for during his service with this company cable cars were widely used. He climbed steadily higher, holding the post of general manager of the Central Traction Company, Centralia, Ill. Upon the consolidation of the Pittsburgh companies Mr. Smith was made superintendent of transportation. From 1901 to 1904 he was assistant manager and later general manager of the Mahoning Valley Street Railway, Youngstown, Ohio, but returned for three years to Pittsburgh. Since 1907 Mr. Smith has been with the Mahoning Valley & Shenango Railway & Light Company, Youngstown, as superintendent, with headquarters at Newcastle.

Guy C. Hecker Appointed Special Engineer

Guy C. Hecker, formerly general engineer for the Westinghouse Electric & Manufacturing Company, has been appointed special engineer in the headquarters office of the American Electric Railway Association, his duties to commence March 15. Mr. Hecker's duties will be principally those which were formerly performed by the present Executive Secretary, J. W. Welsh, when he held the position of special engineer. This office has been vacant since Mr. Welsh was made acting secretary at the time of Mr. Burritt's resignation. It is also expected that this will materially assist the engineering association in its work.

Mr. Hecker's connection with the electric railway industry dates from 1903 when he became connected with the Citizens' Traction Company of Pittsburgh. He was there until 1908 as wireman, and substation and power station operator. In 1908 he entered the electrical engineering course of the Carnegie Institute of Technology at Pittsburgh, working evenings as load dispatcher for the Pittsburgh Railways



G. C. HECKER

Company. He became load dispatcher on the regular force two years later. About 1914 he was made chief electrician of the Pittsburgh Railways Company in charge of substation construction, operation and maintenance; he also had charge of electrical maintenance of power stations until power generation was transferred to the Duquesne Light Company.

After spending, in 1919, a short time as the Pittsburgh representative of Whitman & Barnes Manufacturing Company and later in the year as district manager of the Bristol Company, he became in 1920 a general engineer of the Westinghouse company in the railway department. In this position he has spent a great deal of time in the analysis of railway properties to determine the economies which may be realized by the adoption of automatic substation control. It is from this position that Mr. Hecker has resigned to accept appointment to the American Electric Railway Association.

Mr. Hecker is thirty-four years old.

Dr. Philip A. Brennan, who has been connected with the legal department of the Brooklyn, (N. Y.) Rapid Transit Company, for fifteen years, has resigned from his position. He has been trial counsel for the company in many of its greatest cases, notably those arising out of the Malbone Street tunnel crash in 1917.

E. C. Crosby, who constructed the Springfield (Vt.) Electric Railway, has disposed of all his interests in that company. He has also retired from active management of the Massachusetts Consolidated Railways, Greenfield, but retains his connection with the company. A new company, the Springfield Terminal Railway, takes over the Springfield Electric Railway. He was associated in the construction of the lines of the latter.

Obituary

W. T. Bryan, formerly president of the Athens (Ga.) Street Railway, and one of the best known financiers in Georgia for several years, died recently.

George E. Morris, trial counsel for the Boston (Mass.) Elevated Railway, died Feb. 15, at his home in Milton, Mass. He was a member of the firm of McConnell, Pinanski & Morris.

John A. Weir, ex-president of the Brotherhood of Interborough Rapid Transit Company Employees, died in New York City, Feb. 3. He was formerly an agent on the Subway Division of the Interborough company. From the organization of the Brotherhood in 1916 Mr. Weir held the position of a leader, for his desire to promote the best interests of all employees led him to work constantly for them. He was first a delegate for the station men of the Subway Division, soon after becoming vice-president. This position he held from 1917 to 1918, when he was made president to succeed John A. Phelan. He was re-elected in 1919.

T. J. Evans, builder and operator of one of the first commercial electric railways, died at Hollywood, Cal., on Feb. 2. He was ninety-one years old. Mr. Evans planned, financed, and built the Council Bluffs Street Railway and the present electric railway bridge, which was first used in October, 1880. He organized and directed two construction corporations, the Omaha & Council Bluffs Railway & Bridge Company and the Council Bluffs Street Railway. One company built the bridge and the other built the railway. The figures published at the time showed the bridge cost approximately \$450,000. Mr. Evans eventually devoted all his attention to promotion of public enterprises, building several electric lines in Illinois. He was an associate of Abraham Lincoln and Stephen A. Douglas in his early manhood when his father was a leader in Illinois politics.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

Will Enter Market for Railroad Equipment

J. P. Ernster and A. W. Barker, directing managers of the Founders Organization, 325 Plymouth Bldg., Minneapolis, Minn., expect soon to be in the market for railroad equipment. The firm is connected with the Northern Bond & Investment Corporation and has practically completed the survey from Columbus, on the main line of the Northern Pacific Railroad in Stillwater County, Mont., in a general southwest direction into the New World Mining district at the northeast corner of the Yellowstone National Park. This railroad will be a standard gage, electrically operated. It taps rich coal, timber and mineral districts. It will be 83 miles long. Active construction work of the road, it is expected, will be started this spring. Engineers are now at work on bridge design to cross the Yellowstone River. The same organization plans the erection of an ore reduction plant in the Divide and New World Mining districts and power development in this district. All of the work is under the supervision of the firm.

Standardization Increases Material Salability

An instance in which standardized American overhead trolley wire and transmission line equipment was preferred to a German product is cited in *Commerce Reports* for Feb. 6. An order of material for Swiss use by an American firm showed that the American equipment was purchased in spite of the fact that a much lower figure was obtainable from German manufactured equipment. Investigation shows that the engineer in this case wanted a high class standardized material that could be relied upon not to change periodically and so render obsolete the parts and supplies needed for replacement.

Business Decline Continues

Continued declines in business and industrial activity marked the months of December and January, according to a report issued by the United States Department of Commerce. Pig iron production increased in December to 1,649,000 tons, which was 90 per cent more than the year's minimum point, in July, when 865,000 tons were produced. Sales of structural steel decreased practically 30 per cent in December, when 71,500 gross tons were purchased, but were still three times larger than in February, 1921.

The report notes as of great import that prices have been comparatively

stable for the past six months. It predicts only gradual decreases from now on. Imports and exports increased slightly in December, according to the report. The Department of Commerce has also issued statistics on the average mill prices of lumber for the past six months, and the averages for 1919 and 1920, also preliminary figures for the year 1921.

I. C. C. Reports on 1921 Freight Traffic

Reports just received by the Interstate Commerce Commission show that during 1921 there was a falling off in the freight traffic of the country of approximately 23.3 per cent compared with the volume the previous year. The greatest decrease, the reports showed, was in the Eastern District, where the net ton miles for the past calendar year amounted to 172,394,000,000, a reduction of 55,906,000,000 or 24½ per cent compared with the year before. The Western District came next with a reduction of 22½ per cent, the net ton miles totaling 127,044,000,000, which was 36,910,000,000 below 1920. A falling off of 20.6 per cent was reported by the carriers in the Southern District, where the net ton miles totaled 44,729,000,000 in 1921 compared with 56,303,000,000 or a reduction of 11,574,000,000 net ton miles in 1920.

Electrification of Central Railway of Brazil

Announcement and call for tenders for the electrification of certain lines of the Central do Brazil Railway, the supply of traction and transport material, and material for construction of substations has been forwarded to the Bureau of Foreign and Domestic Commerce, Washington, D. C.

These specifications will be loaned to firms interested through the bureau's district offices. Inquiries should be sent to the Electrical Equipment Division, referring to file No. 877.

Boston Makes Budget

The Boston Elevated Railway's budget for 1922 will amount to at least \$4,000,000. Of this sum \$2,000,000 will represent replacement due to depreciation and \$2,000,000 additional capital account.

\$3,750,000 Electrification Contract Awarded

It is announced that the Metropolitan-Vickers Electrical Corporation, Manchester, has secured the first contract in connection with the electrification of the South African Railways. The value of the order is between £750,000 and £1,000,000. The section involved is the main line in Natal from Glencoe to Pietermaritzburg, a distance of about 120 miles. The country is mountainous and the mineral traffic on the railway is heavy. About 70 electric locomotives will be supplied, and they will haul heavier trains over the gradients than the steam locomotives have been able to do.

ELECTRIC RAILWAY MATERIAL PRICES—FEB. 28, 1922

Metals—New York

Copper, electrolytic, cents per lb.	12.75
Lead, cents per lb.	4.70
Nickel, cents per lb.	41.00
Zinc, cents per lb.	4.85
Tin, Straits, cents per lb.	29.875
Aluminum, 98 to 99 per cent, cents per lb.	19.00
Babbitt metal, warehouse, cents per lb.: Best grade	32.00
Commercial	16.50

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	\$4.60
Somerset mine run, Boston	1.87
Pittsburgh mine run, Pittsburgh	2.15
Franklin, Ill., screenings, Chicago	2.00
Central, Ill., screenings, Chicago	1.80
Kansas Screenings, Kansas City	2.50

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	\$40.00
Standard open hearth rails, gross ton	\$40.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2.05
Tie plates (flat type), cents per lb.	2.00
Angle bars, cents per lb.	2.40
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.12½
Steel bars, cents per lb.	1.37½
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	1.35

Hardware—Pittsburgh

Wire nails, cents per lb.	2.40
Sheet iron, (24 gage), cents per lb.	2.85
Sheet iron, galvanized, (24 gage), cents per lb.	3.55
Galvanized barbed wire, cents per lb.	3.05
Galvanized wire, ordinary, cents per lb.	2.75

Waste—New York

Waste, wool, cents per lb.	13.00
Waste, cotton, (100 lb. bale), cents per lb.: White	10.00
Colored	9.00

Paints, Putty and Glass—New York

Linseed oil, (5 bbl. lots), cents per gal.	94.00
White lead, (100 lb. keg), cents per lb.	12.25
Turpentine, (bbl. lots), cents per gal.	88.00
Car window glass, (single strength), first three brackets, A quality, discount*	85.5%
Car window glass, (single strength), first three brackets, B quality, discount*	86.5%
Car window glass, (double strength, all sizes, A quality), discount*	85%
Putty, 5 lb. tins, cents per lb.	5.50

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	14.12½
Rubber-covered wire, cents per lb.	6.00
Weatherproof wire base, cents per lb.	15.50

Paving Materials

Paving stone, granite, 4 x 8 x 4, f.o.b. Chicago, dressed, per sq. yd.	\$3.35
Common, per sq. yd.	3.00
Wood block paving 3½, 16 treatment, N. Y., per sq. yd.	2.17
Paving brick, 3½ x 8½ x 4, N. Y. per 1,000 in carload lots	49.50
Crushed stone, ½-in., carload lots, N. Y., per cu. yd.	1.80
Cement, Chicago consumers net prices, without bags	1.94
Gravel, ½-in., cu. yd., N. Y.	1.75
Sand, cu. yd., N. Y.	1.00

Old Metals—New York

Heavy copper, cents per lb.	9.37½
Light copper, cents per lb.	7.87½
Heavy brass, cents per lb.	4.87½
Zinc, old scrap, cents per lb.	2.37½
Yellow brass, cents per lb. (heavy)	4.87½
Lead, heavy, cents per lb.	3.62½
Steel car axles, Chicago, net ton	\$13.25
Old car wheels, Chicago, gross ton	14.75
Rails (short), Chicago, gross ton	12.25
Rails (relaying), Chicago, gross ton	22.50
Machine turnings, Chicago, net ton	5.25

Rolling Stock

Buffalo & Lake Erie Traction Company, Buffalo, N. Y., operating in the city of Erie has awarded a contract for the building of twenty-five new cars to the J. G. Brill Company for delivery some time during the month of May. They are of the one-man type. The cars are to be put in operation about June 1, according to present plans.

The **United Electric Railways**, Providence, R. I., will install one-man safety cars on one urban and seven suburban lines. These routes are Chalkstone-Elmwood Avenue, North Scituate, Chepochet, Warren and Bristol, Riverpoint-Rocky Point, Pawtucket-Cumberland, and Cranston cross-town. The company will buy new cars and also convert double truck cars for one-man operation.

Illinois Traction System, based on its experience in Quincy, Ill., and Wichita, Kan., has purchased Economy meters for the street railway systems in Peoria and Bloomington, Ill., and for the cars of the St. Louis Electric Terminal Railway, which operate over the McKinley Bridge between St. Louis and the Illinois suburbs of St. Louis. All of the meters used by the Illinois Traction System are equipped with the car inspection dials.

Track and Roadway

Wilkes-Barre (Pa.) Railway has been ordered by the Public Service Commission, in a decision dated Aug. 16, 1921, and just published, to reconstruct its track underneath the overhead bridge in the town of Duryea. The estimated cost is placed at \$2,035. The order states that the work was to be completed by January of this year.

Grand Rapids (Mich.) Railway will install a trackless trolley extension on Bridge Street if the company is given a franchise by the city. The company's tracks will, in that event, also be extended on Kalamazoo Avenue from Franklin Street to the cemetery, on Division Avenue from Burton to Alger Street, and on College Avenue to the country club.

Miami Beach Electric Company, Miami, Fla., is now operating cars on West Flagler Street to a point beyond the Flagler Street bridge. Wires are being stretched to the end of the line in the northwest part of the city and cars are being operated on the line as the construction progresses. The Miami Beach Electric Company leases the Flagler Street line from the city.

Birmingham Railway, Light & Power Company Birmingham, Ala., is installing the necessary turnouts to allow the new routing which is now in progress. Extension of the Norwood line around the Norwood boulevard is expected to be completed very soon. Ties and rails have already been laid. It is

stated that the wires will be strung in a short time. The extension is expected to be put in operation when the one-man cars are put on.

Power Houses, Shops and Buildings

Trenton & Mercer County Traction Corporation, Trenton, N. J., had its two-story brick garage badly damaged recently by fire. Two trucks were burned.

Lake Shore Electric Railway, Cleveland, Ohio is negotiating at Fremont with the owners of the Birchard building for the entire ground floor for use as a waiting room and ticket office. At present, the electric line occupies a part of the Wheeling & Lake Erie Railway station for office purposes.

Springfield (Mass.) Street Railway may have a new office building and waiting room for its patrons if the plan for the development of the bridge approaches submitted by Architect Cobb of the Improvement League is carried out. His suggestion is the building of a trolley terminal building on the vacant plot at the corner of Broadway and Vernon Street. This would help in the plan of the East-Side bridge approach.

Indiana Service Corporation, Fort Wayne, Ind., is rapidly completing the last link in a high-voltage circuit which will encircle three-quarters of the city and which will furnish electric power to the mammoth new truck plant of the International Harvester Company, on which construction work will start about the middle of March. The company, upon completion of the present last link, will have the city surrounded on three sides by a 33,000-volt system. It is planned to extend the present system back to the Spy Run power plant, thus completing the circuit.

Franchises

Dallas-Terrell (Tex.) Interurban, now being built from Dallas to Terrell, has asked the City Council of Terrell for a franchise within the city limits of that city for the operation of its cars. It is proposed to have the line enter the city from the west over the campus of the Texas Military College, thence down Grove Street to the Texas Midland Railway, where the interurban station will be located. Officials of the interurban company have asked for this route on account of the connection it will make with the Texas-Midland Railway, which officials of the interurban company declare, it is planned eventually to purchase from E. H. R. Green, its present owner. The plans of the interurban company call for the electrification of the Texas-Midland throughout its length and its operation as an interurban line from Paris on the north, via Greenville, Terrell, Kaufman to Ennis on the South. Extension of the Dallas-Terrell line to Tyler is also planned in the future.

Trade Notes

The **F. Bissell Company**, Toledo, Ohio, jobber of electrical supplies and power apparatus, and manufacturer of the Bissell electric suction cleaner, has recently moved from 226-230 Huron Street to its own building at 812-822 Lafayette Street.

Simmen Automatic Railway Signal Company, Eden, N. Y., has announced that Exum M. Haas, formerly manager of the railroad departments of the Austin Company and the H. K. Ferguson Company both of Cleveland, Ohio, and Western editor of the *ELECTRIC RAILWAY JOURNAL* from 1911 to 1916, has joined its organization in an executive capacity.

Roller-Smith Company, New York City, N. Y., announces the appointment of Pendleton E. Lehde, 609 Whitney Central Building, New Orleans, La., as a special representative in the State of Louisiana and the southern part of Mississippi. Mr. Lehde will handle the Roller-Smith Company's line of electrical instruments, electric meters and electric circuit breakers in that territory. By reason of his wide acquaintance and experience, Mr. Lehde is well equipped to handle the Roller-Smith Company's lines.

New Advertising Literature

Consolidated Car-Heating Company, Albany, N. Y., has just issued a new bulletin, No. 9-A, covering its line of resistances and fuse boxes designed particularly for use on electric railway cars.

The **Ohio Brass Company**, Mansfield, Ohio recently issued a pamphlet with a double page spread descriptive of its improved O-B Type C Splicer. The pamphlet describes the improvements made to give increased life and strength.

The **General Welding & Equipment Company**, Boston, Mass., has issued a descriptive pamphlet of the "GEWE" automatic cutting machines. This describes the equipment used for cutting steel plates and other parts by means of an automatically controlled gas torch.

The **Cutter Company**, Philadelphia, Pa., has issued a thirty-six-page booklet, describing in considerable detail various types of steel box mountings for its I-T-E circuit breakers. Various other details in regard to satisfactory mounting and use of these circuit breakers are also given.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., is distributing two circular reprints relating to babbitt. One contains a discussion of the production of babbitt metal together with photographs of equipment used in its manufacture as well as the results of various tests of samples of alloys. The other reprint is a general discussion of the cost of lead base babbitt metal.



Transportation

Superintendents—

Get in on this!

The installation and maintenance of brakes is a mechanical department job, but their efficiency and reliability in operation is of greatest importance to you. The subject of brakes deserves your closest study.

PEACOCK BRAKES

—for quicker stops
—for smoother stops
—for safer operation

The eccentric chain-winding drum which is the special feature of the Peacock Improved Brake makes it a fast as well as an unusually powerful brake. The rapidity with which it will bring a speeding car to a dead stop will be valuable both in improving schedule speeds and preventing accidents. The perfect control which the motorman has, permits of smoother stops. If you want better operating results—look into the subject of better brakes for your cars.



Peacock Improved 12/52 Gear Ratio Brake

National Brake Company, Inc.

890 Ellicott Square, Buffalo, N. Y.

Bankers and Engineers

Ford, Bacon & Davis

Incorporated

Business Established 1894

PHILADELPHIA NEW YORK SAN FRANCISCO
DETAILED EXAMINATIONS BY EXPERTS
Reports for Financing covering Valuation, Turnover, Costs, Reserves, Rates,
UTILITIES INDUSTRIALS SHIPPING

THE J. G. WHITE ENGINEERING CORPORATION

Engineers—Constructors

Industrial Plants, Buildings, Steam Power Plants, Water
Powers, Gas Plants, Steam and Electric Railroads,
Transmission Systems

43 Exchange Place, New York

STONE & WEBSTER

Incorporated

EXAMINATIONS REPORTS VALUATIONS
ON

INDUSTRIAL AND PUBLIC SERVICE PROPERTIES

NEW YORK BOSTON CHICAGO

JOHN A. BEELER

OPERATING, TRAFFIC AND RATE INVESTIGATIONS
SCHEDULES—CONSTRUCTION—VALUATIONS
OPERATION—MANAGEMENT

52 VANDERBILT AVE., NEW YORK

SANDERSON & PORTER ENGINEERS

REPORTS, DESIGNS, CONSTRUCTION, MANAGEMENT
HYDRO-ELECTRIC DEVELOPMENTS

RAILWAY, LIGHT and POWER PROPERTIES

CHICAGO NEW YORK SAN FRANCISCO

A. L. DRUM & COMPANY

CONSULTING AND CONSTRUCTING ENGINEERS

VALUATIONS AND FINANCIAL REPORTS
CONSTRUCTION AND MANAGEMENT OF ELECTRIC
RAILWAYS

76 West Monroe St.

CHICAGO, ILL.

THE ARNOLD COMPANY

ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL
105 South La Salle Street
CHICAGO

ENGELHARDT W. HOLST

Consulting Engineer

Appraisals, Reports, Rates, Service Investigation,
Studies on Financial and Physical Rehabilitation
Reorganization, Operation, Management

683 Atlantic Ave., Boston, Mass.

ALBERT S. RICHEY

ELECTRIC RAILWAY ENGINEER

WORCESTER POLYTECHNIC INSTITUTE

WORCESTER, MASSACHUSETTS

L. E. GOULD

Consultant and Specialist

Energy Measurement
For Electric Railways

Investigations · Tests · Recommendations
Old Colony Bldg. Chicago

JAMES E. ALLISON & CO.

Consulting Engineers

Specializing in Utility Rate Cases and
Reports to Bankers and Investors

1017 Olive St., St. Louis, Mo.

ROBERT M. FEUSTEL

CONSULTING ENGINEER

Rate, Traffic and Reorganization
Investigations

Fort Wayne, Indiana

C. E. SMITH & CO.

Consulting Engineers

2065-75 Railway Exchange Bldg., St. Louis, Mo.
Chicago Kansas City

Investigations, Appraisals, Expert Testimony, Bridge
and Structural Work, Electrification, Grade Crossing
Elimination, Foundations, Power Plants

WALTER JACKSON

Consultant

FARES, BUSES, MOTOR TRUCKS

More revenue from more riders

143 Crary Ave., Mt. Vernon, N. Y.

HEMPHILL & WELLS

CONSULTING ENGINEERS

Gardner F. Wells John F. Layng Albert W. Hemphill

APPRAISALS

INVESTIGATIONS COVERING

Reorganization Management Operation Construction

43 Cedar Street, New York City

Parsons, Klapp, Brinckerhoff & Douglas

WM. BARCLAY PARSONS
EUGENE KLAPP

H. M. BRINCKERHOFF
W. J. DOUGLAS

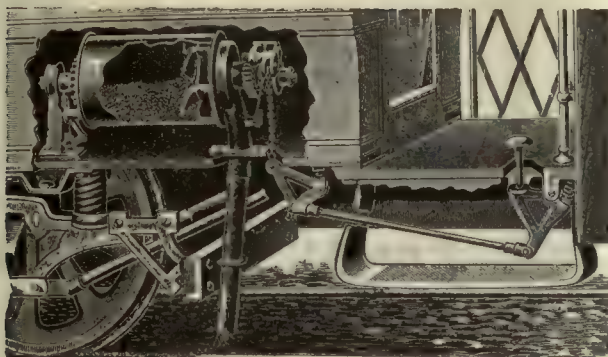
Engineers—Constructors—Managers

Hydro-electric Railway Light and Industrial Plants
Appraisals and Reports

CLEVELAND
743 Hanna Bldg.

NEW YORK
84 Pine St.

Sprague Rotary Track Sanders

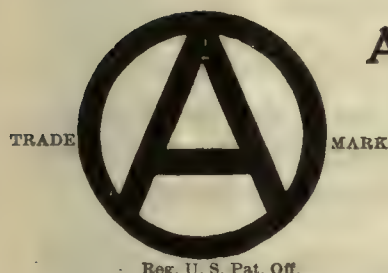


force the sand
onto the rail!

Every time you press the foot pedal, a positive mechanical action forces sand out of the drum. It doesn't depend on gravity to get it started. Sand won't stick or clog with this equipment. The motorman knows "it's there."

You need reliable Sprague Sanders on every car to prevent accidents on slippery rails which come with Winter Weather.

Write for details and prices.

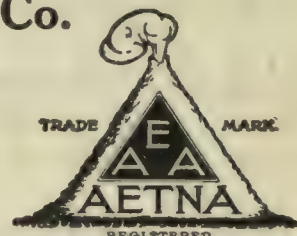


Albert & J. M. Anderson Mfg Co.

Established 1877

289-293 A St., Boston, Mass.

Branches—New York, 135 B'way. Philadelphia, 429 Real Estate Trust Bldg. Chicago, 105 S. Dearborn St. London.



Reg. U. S. Pat. Off.

PETER WITT
UTILITY CONSULTANT
456 Leader-News Bldg., Cleveland, O.

SPOONER & MERRILL
Consulting Engineers

Valuations; Reports; Design Power Plants, Waterways, Flood Relief; Counsel Engineering Litigation.

Powers Theatre Building, Grand Rapids, Mich.

ENGEL & HEVENOR
Incorporated
TRACK

Engineers—Constructors—Maintenance
Appraisals—Valuation—Rehabilitation
Steam and Electric Railroads
Estimates

220 BROADWAY, NEW YORK

THE COAL & IRON NATIONAL BANK
of the City of New York

Capital \$1,500,000

Surplus \$1,000,000

Und. Profits \$363,051

Resources \$23,743,000

Offers to dealers every facility of a New York
Clearing House Bank.



DAY & ZIMMERMANN, INC.
ENGINEERS

*Design, Construction
Reports, Valuations, Management*

NEW YORK PHILADELPHIA CHICAGO

THE P. EDWARD WISH SERVICE

50 Church St.
NEW YORK

Street Railway Inspection
DETECTIVES

131 State St.
BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.



Use them in your terminals—
PEREY TURNSTILES
or **PASSIMETERS**

Faster than the ticket seller

Perey Manufacturing Co., Inc.
30 Church Street, New York City



A one-man car equipped with an Ohmer Fare Register with a capacity of twelve different fare classifications.

OHMER Fare Registers

*For All Types of Cars
For All Conditions*

The presence of an Ohmer Fare Register in a car, whether it be a city or an inter-urban car, a one-man or a two-man car or a motorbus, is proof positive that the management is working in accordance with the best principles of modern business.

A retail sale, whether it be a loaf of bread, a cigar, or a street car ride, should be indicated as to the amount and the amount recorded at the time of payment. No other way has been found safe.

The Ohmer Fare Register clearly indicates the amount and classification of the fare paid and records it as part of an unchangeable printed record.

The Ohmer Fare Register places modern merchandising methods in the hands of the electric railway manager, and makes it possible for him to protect himself, his employees and the public from annoyance and loss.



An Ohmer Fare Register installed on a motor bus.

OHMER
Fare Register Company
Dayton, Ohio

MERITAS

LEATHER CLOTH

Meets Every Railroad Requirement

MERITAS Leather Cloth is particularly well adapted to railroad use, for seat upholstery and for shades.

It is sanitary. Dust and smoke can be wiped off with a damp sponge or cloth. It will not harbor vermin, as will pile fabrics. It does not absorb perspiration, stains, or moisture. Can be washed with water when necessary.

Meritas Leather Cloth is ideal for use in smoking-cars—it does not retain the smell of tobacco smoke as long as plush will, or catch and hold ashes, as will cane.

When used for shades, Meritas Leather Cloth does not become brittle or fade under strong sunlight, is pliant and does not crack or peel.

Under severe tests Meritas Leather Cloth has proved its ability to retain its lustre, pliancy and embossing longer, and withstand more general abuse, than any similar product.

Samples sent gladly on request

THE STANDARD TEXTILE PRODUCTS CO.

320 BROADWAY, NEW YORK

Dept. E.R.J.



The approaching question:
"What shall I do



The maintenance on this track by using shims has been enormous and is only short lived. The rails appear to be good, but the joints are battered and low and the constant hammering over them is ruinous to the rolling stock, not to say a word about the lost cur-

rent. If I could find a cure for this condition at not too great a cost, I believe I could postpone rebuilding this track for six or seven years, and by that time this Company may be in better financial condition.

DAYTON

with this track?"

I have it!

I'll use those Dayton Resilient Joint Boosters. They allow the use of concrete under the Booster, and provide for a shock absorber in the Booster itself, which saves the concrete from breaking up under the hammer blows; moreover, they can be installed without any interruption to traffic. The price of \$4.50 for a "Booster" is a mere nothing because the chief expense of repairing a bad joint is the tearing out of the old paving and replacing it, whereas if I add the Booster to the job I can forget about the repairs for several years. The old saying, "Opportunity only knocks at your door once is true," so I will not let it be said that I passed up an opportunity, but will order the Joint Boosters a once.



Resilient
JOINT BOOSTER

**THE DAYTON
MECHANICAL TIE COMPANY**

708 Commercial Building
DAYTON, OHIO



"Where do you get that stuff?"

"About your goin' through three winters already without stickin' a new pin or bushing in your brake rigging."

"Well, pigs is pigs and facts is facts. Take it from me, that I wouldn't be a bit surprised to go through three more freezers without a change. And does it please the boys down in the pits? I'll say it does."

"Say, how do you get that way? Are you spoofin', kiddin' or what?"

It's Boyerizing That Does It!

"This is the straight goods. Remember the time you gave me the ha-ha for paying what you called a fancy price for Boyerized Pins and Bushings? Kind of dim, now, because it's so long ago, what? Well, that's the combination that's still on those first cars. And that's why every other d.....d (probably stands for devoted) car we've got is goin' to be Boyerized, too. That motto about 'The first cost is the last' goes for me, too, when I get more thousands of miles per dollar."

"You've handed me a car-ful all-right. Guess I'll get some of that stuff, too."

"Right-o. And don't forget that the same crowd get out a lot of other stuff that keeps the cars hoppin' over the line instead o' cloggin' up the shops. For instance,

Boyerized Stag Brand Manganese Brake Heads

Brake Hangers
Center Bearings

Brake Levers
Side Bearings

Pedestal Gibs
Spring Post Bushings

Brake Fulcrums
Spring Posts

Bolster and Transom Chafing Plates

BEMIS CAR TRUCK COMPANY

Electric Railway Supplies

Springfield, Mass.

REPRESENTATIVES:

Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.

J. H. Denton, 1328 Broadway, New York City, N. Y.
W. F. McKenney, 54 First Street, Portland, Oregon.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.

OILLESS TROLLEY WH

S TROLLEY WHEEL



Positive and Practical Advantages

The problem, as we see it, in the design and construction of V-K Trolley Wheels and Harps involves many considerations that are too often overlooked, yet when overlooked they always result in troublesome deficiencies.

These considerations are: (1) Quality of metal, (2) Conductivity, (3) Resistance to friction, (4) Effect on overhead, (5) Balance, (6) Shape and size of groove, (7) Pressure on pole, (8) Tension on wire, (9) Cost of maintenance.

V-K Trolley Wheels and Harps lead to greater efficiency, longer service and reduced maintenance expense simply because these considerations have been incorporated into their design and construction.

The result is that they are generally considered standard equipment in the field of electric railway operation.

More-Jones Brass & Metal Co.
St. Louis, Missouri

V-K

TROLLEY WHEELS:
V-K Oilless, M-J Lubricated
HARPS: V-K Non-Arcing
BEARINGS: "Tiger"
Bronze
Axle and Armature
ARMATURE BABBITT
and Similar Products

MORE-JONES

Three hundred million dollars *for* Electric Railway Maintenance

In the spring the railway man's fancy lightly turns to thoughts of maintenance. Good times or bad, electric railways must be kept running. A hundred thousand cars on 47,000 miles of track carry fifteen billion passengers a year through boom times or business depression. And every ten years another ten or twenty million potential riders are added to our population.

Even if the electric railway industry were not now decidedly on the upward swing toward restored prosperity, the wear and tear of service would annually make a tremendous market for equipment materials and supplies. In fact, the past slackness in the buying of new equipment makes maintenance work proportionately more active and the sum spent varies little from year to year and now is the time to go after maintenance business.

Hence the *Electric Railway Journal's* Annual Maintenance Number which this year will be dated March 18. Its text pages will cover the subject from a what-to-do viewpoint. The advertising pages will tell what-to-do-it-with.

It's a good issue in which to exhibit your whole line and to tell your whole story. The audience includes 99% of the industry's buying power. The readers depend on *Journal* service to help them solve their problems and to do their work effectively.

More than ever before, electric railway men are seeking more efficient, more economical ways of conducting their business. If you can help them build up their profits, they are more than ready to help you build up yours.

Tell them in the
March 18 Maintenance Issue
of the Electric Railway Journal and
**Reserve your space now to secure
the most favorable location for your
big-effort advertisement**

Copy suggestions gladly submitted without committing you. Please tell us now how we can serve you so that we can have time to do a real job.

ELECTRIC RAILWAY JOURNAL
Tenth Avenue at 36th Street, New York, N. Y.

January 7, 1922

ELECTRIC RAILWAY JOURNAL

25

British Electric Railway Prospects

FROM OUR LONDON NEWS REPRESENTATIVE

IN AN article by the present writer which was published in the **ELECTRIC RAILWAY JOURNAL** of Jan. 1, 1921, an outline was given of what has been done in the past in the way of converting steam railways in England to electric traction and there was appended an indication of the existing schemes for further electrification. Since that time no further work of the kind has been put in hand, though the conversion of the London & North Western Railway suburban lines has been brought under completion. The condition of high rate of interest additional

The status and outlook for British electric railways, as outlined by Mr. McCallum, may be summarized as follows:

Railway electrification is greatly needed and the roads are ready with plans, but work is being held up by high interest rates. Some rapid transit improvements are under way. Tramways will do little new construction till prices fall. New routes are being operated by buses. Some reductions in tramway fares are being made. Reductions are being conducted to reduce the weekly guinea.

should be made for the purpose of insuring that the future electrification of railways should be carried out to the best advantage in regard to the interchange of electric locomotives and rolling stock, and whether any regulations should be made to limit the development potential.

326 "Tool Steel" Gears } But for the
387 "Tool Steel" Pinions } new eqpt.

tion and weeding out will be required.

THE ELECTRIFICATION SCHEMES GIVEN IN DETAIL.

The proposals which have been made public, but for only a few of which (so far as is known) have applications for guarantee been made, may be briefly indicated. The main reasons for the proposals are that they would increase the capacity of congested railways, reduce the risk of running and produce economical operation. The London, Brighton & South Coast Railway, which already works part of its main line electrically on the single-phase high-tension system, possesses Parliamentary powers to electrify the remainder.

main
company
facilities
governm
ments a
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thority,
His Lo
interest
tageon

373 "Tool Steel" Gears } used
429 "Tool Steel" Pinions }

ve to be sought.

Other schemes which are still awaiting development and in regard to which nothing immediate is promised are the London & South Western Railway extension of electric traction involving 45 miles of route, the construction of the Wimbledon and Sutton authorized electric railway, and the authorized electrification of the L

366 "Tool Steel" gears } Bot on
350 "Tool Steel" pinions } the new
eq't.

Since 1913 these have made over
400,000 miles and still are barely
polished. No measurable wear
275 H.P. motors.

They are all delighted with their purchase. - So are you
if you have tried "Tool Steel"

The Tool Steel Gear & Pinion Company

Cincinnati, Ohio



In Chicago and Outside!

On the long, fast elevated passenger trains, and the heavy electric switching locomotives of the Northwestern Elevated Railroad of Chicago, they use reliable, long-wearing "Standard" Rolled Steel Wheels. And then too, on that high-speed interurban line,—the Chicago & Milwaukee Electric Railway—now famous for superlative service, speed and safety they also use them.

"STANDARD"

Steel Tires
Steel Tired Wheels
Solid Rolled Steel Wheels
O. H. Steel and Malleable Iron Castings
Solid Forged Gear Blanks
Steel Forgings
Iron Forgings
Forged and Rolled Steel
Pipe Flanges
Ring Dies
Rings
Roll Shells
Steel Springs



"The 'Standard' Brand on your material is an assurance of eventual economy."



Standard Steel Works Company
500 North Broad St., Philadelphia, Pa.

CHICAGO
ST. LOUIS
HAVANA, CUBA
ST. PAUL

RICHMOND
SAN FRANCISCO
NEW YORK
HOUSTON

PORTLAND, ORE.
MEXICO, CITY
BOSTON, MASS.
PITTSBURGH, PA.



ARA 1917

"49"



THE map above shows the location of the 49 foundries in the United States and Canada, represented by the Association of Manufacturers of Chilled Car Wheels.

Chicago, 3
St. Louis, 2
Buffalo, 4
Pittsburgh, 2
Cleveland, 2
Amherst, N. S.
Montreal
Mich. City, Ind.
Louisville
Mt. Vernon, Ill.
Ft. Wayne, Ind.
Birmingham
Atlanta
Savannah
Boston
Detroit
St. Paul
Kansas City, Kan.
Denver
Tacoma
Rochester, N. Y.

Sayre, Pa.
Berwick, Pa.
Albany
Toronto
New Glasgow, N. S.
Madison, Ill.
Huntington, W. Va.
Wilmington, Del.
Houston, Tex.
Hannibal, Mo.
Reading, Pa.
Baltimore
Richmond, Va.
Ft. William, Ont.
St. Thomas
Hamilton
Ramapo, N. Y.
Marshall, Tex.
Los Angeles
Council Bluffs

American Railroad Association Standards

650 lb. wheel for 60,000 Capacity Cars
700 lb. wheel for 80,000 Capacity Cars
750 lb. wheel for 100,000 Capacity Cars
850 lb. wheel for 140,000 Capacity Cars

The Standard Wheel for Seventy-One Years

ASSOCIATION OF MANUFACTURERS
OF CHILLED CAR WHEELS
1847 McCormick Bldg., Chicago

CHILLED IRON WHEELS
for railway and street car
service. Capacity 20,000 per
day. 25,000,000 in service.

CHILLED IRON WHEELS

International Fare Registers



Type R-10. Single Register.

Accurate, dependable registration which assures a complete check on fare collections is secured by the use of International Registers. This reliable accounting of collections is the direct result of years of experience with registration requirements on street railway and city systems. Installations to meet individual conditions will be recommended on the basis of this experience. International Registers are made in single and double types, are rugged in construction and of that accurate manufacture which gives long life and minimum repair expense.

Manufacturers of Single and Double fare registers, counters, car fittings. Exclusive selling agents for HEEREN ENAMELED BADGES.

The International Register Co.
15 South Throop Street, Chicago

KINNEAR ROLLING • DOORS KINNEAR

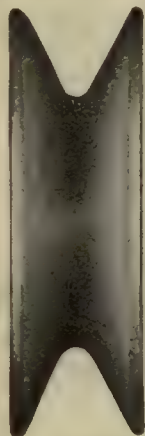
Doors That Really Help!

KINNEAR ROLLING DOORS make your buildings more efficient—because these doors are so easy to operate; because they last so long; because they may be repaired in case of accident without dismantling; because they do not rust or warp. Kinnear Doors are an integral part of the building—made to conform exactly to the conditions under which your buildings must be used. Our engineering department is at your service for consultation; our branches assure perfect installation.

THE KINNEAR MANUFACTURING COMPANY

926-36 Field Ave., Columbus, Ohio
New York Office: 1182 Broadway

Municipal Car Barn—San Francisco



"U"

The Whole Trolley!

Consider the advantage of having one standard material for the whole trolley pole from car roof to wire, especially if you use throughout high-grade, reliable—

BAYONET Equipment

Trolley Wheels
Trolley Harps
Detachable Pole Clamps
Trolley Bases
Sleet Cutters

For Fast Work

All parts fit and co-ordinate with greatest possible facility. Bayonet Trolley Harps are made with a quick-detachable feature which permits a change of harp and wheel in 10 seconds. In 30 seconds, with the detachable pole clamp, you can change an entire trolley. Standardize on Bayonet equipment for maximum economy and efficiency.



Send for
sample equipment
for trial

Bayonet Trolley Harp Co.
Springfield, Ohio



20% Saving in Pole Costs

When you buy Bates Poles for a required pole strength, you save 20% to 40% of the usual weight.

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CORRUGATED ^{TONCAN}METAL CULVERTS**

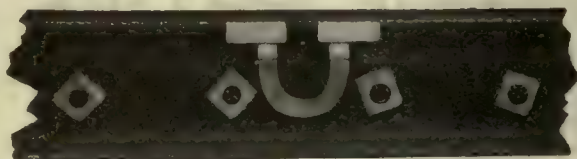


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For cross and special bonding

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have no superior for extended bonding, combining the highest conductivity with rapid economical application.



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*Let us quote you on your
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Mechanically—Electrically**

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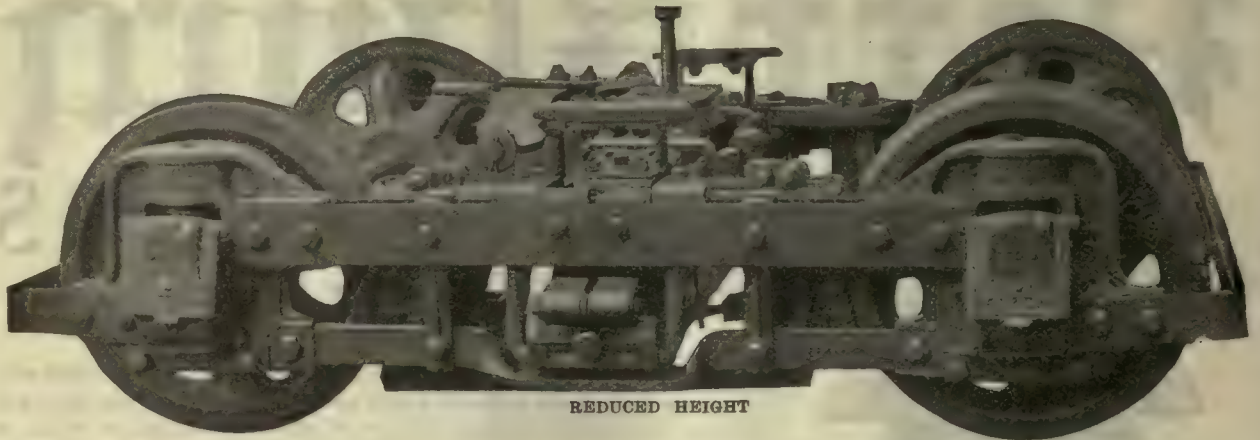
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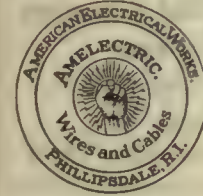
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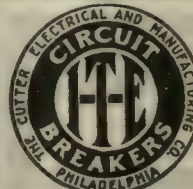
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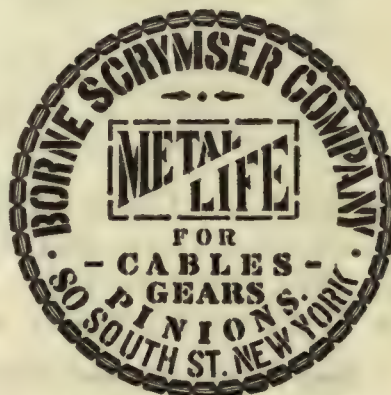
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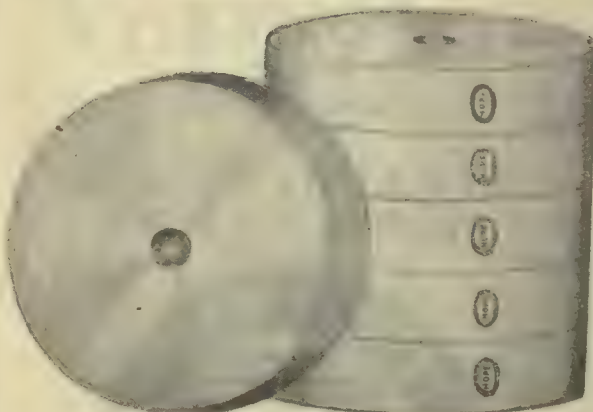
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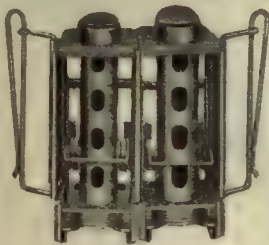
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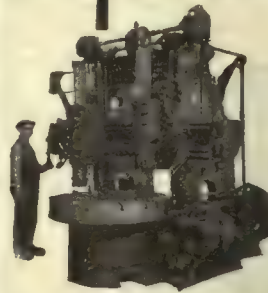
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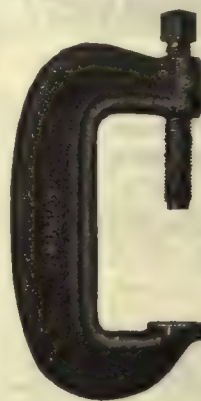
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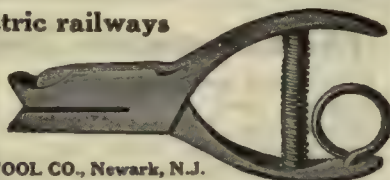
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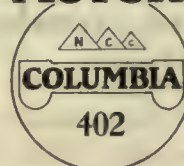
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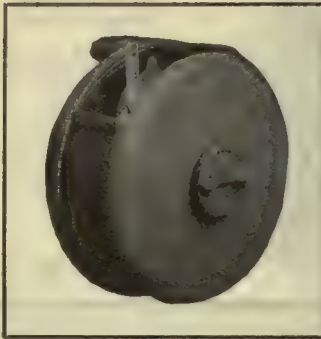
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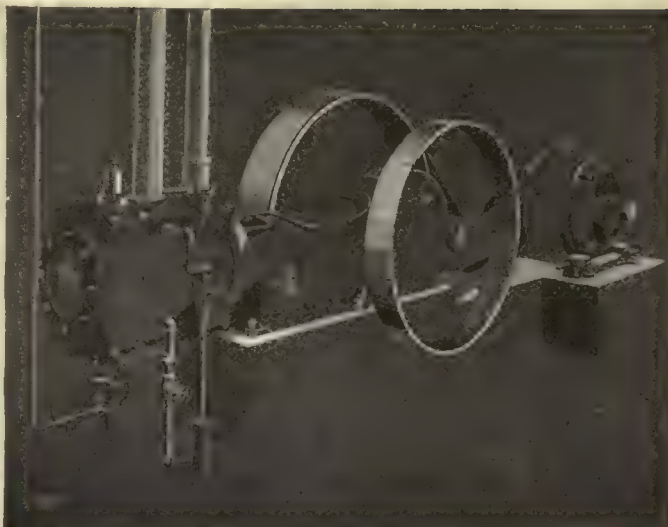
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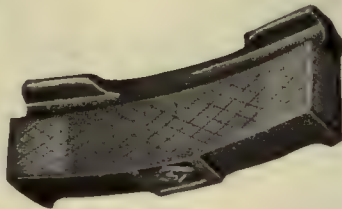
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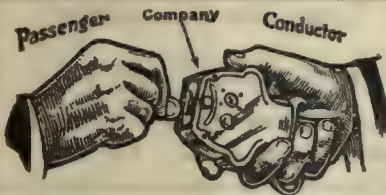
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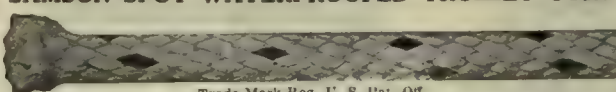
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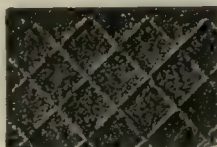
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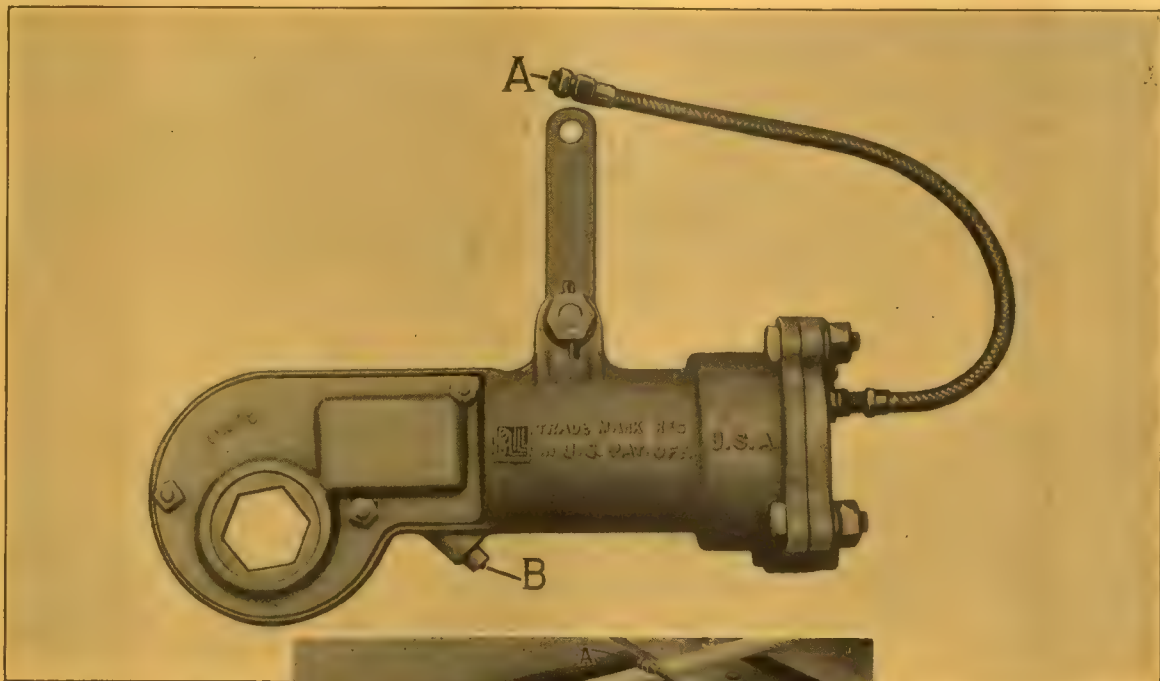
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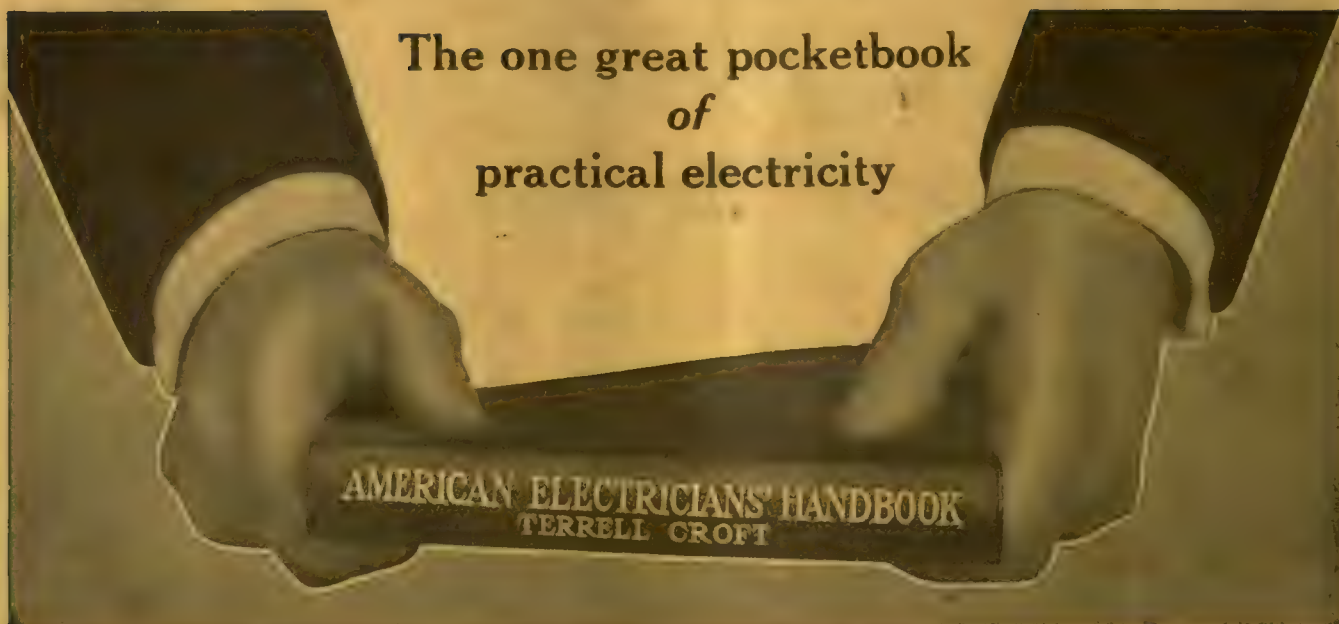
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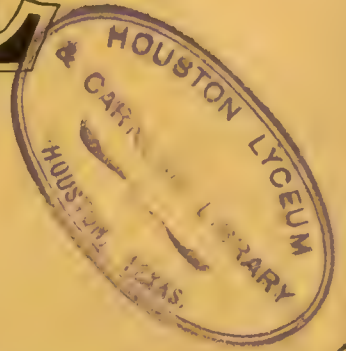
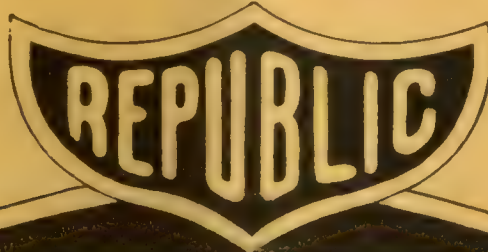
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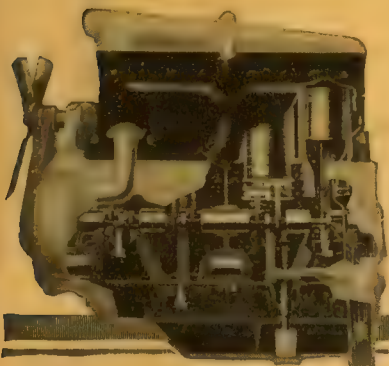
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Sales Offices in All Large American Cities



& Manufacturing Co.
East Pittsburgh, Pa.

Westinghouse

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors

HENRY H. NORRIS, Managing Editor

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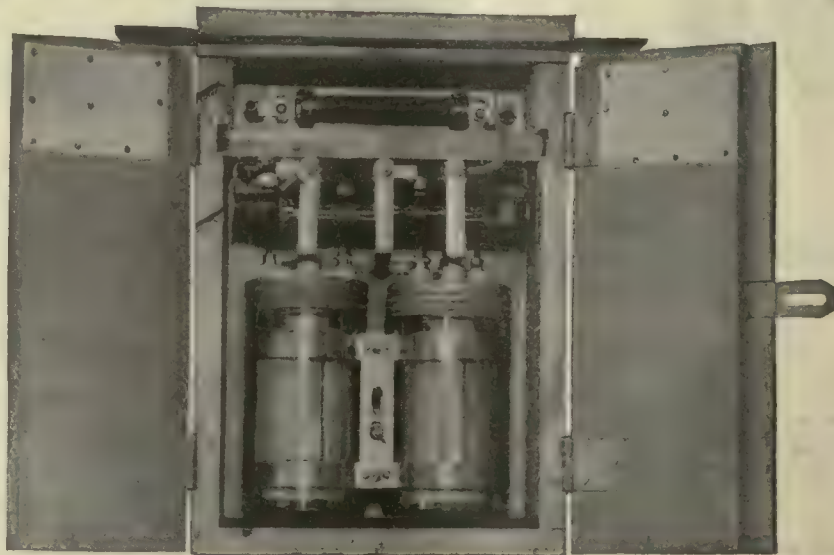
It is because "Electric Railway Journal" conveys knowledge and understanding of methods, equipment, materials and supplies that its advertising pages are used regularly by the principal manufacturers in the electric railway field to help economize selling cost. They know from long experience that these pages help to establish acquaintance and to build faith. The resulting economy enables the advertisers to keep the price down while keeping the quality up.

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where they can save power,
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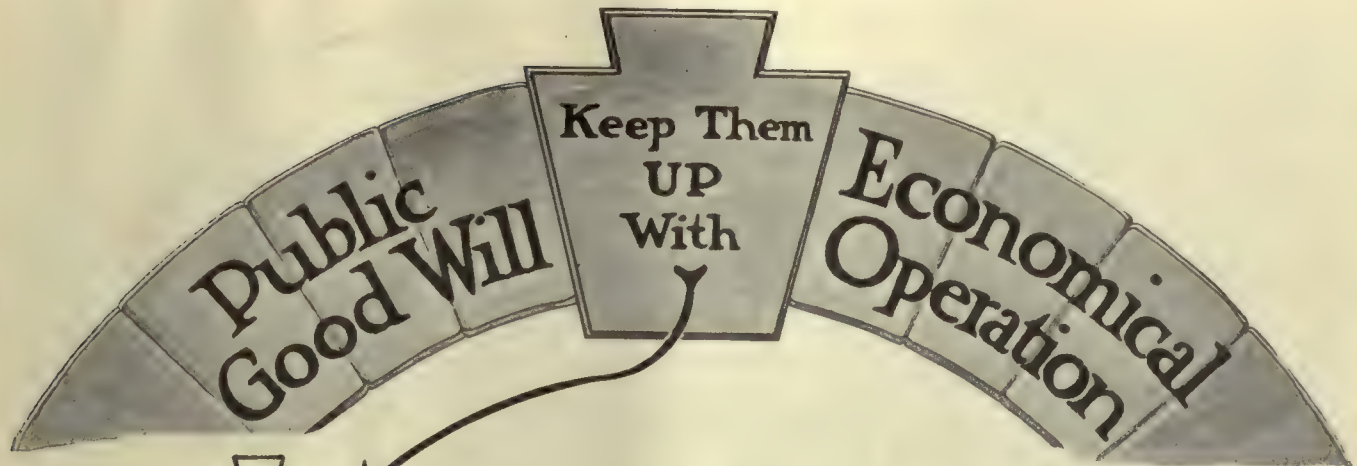
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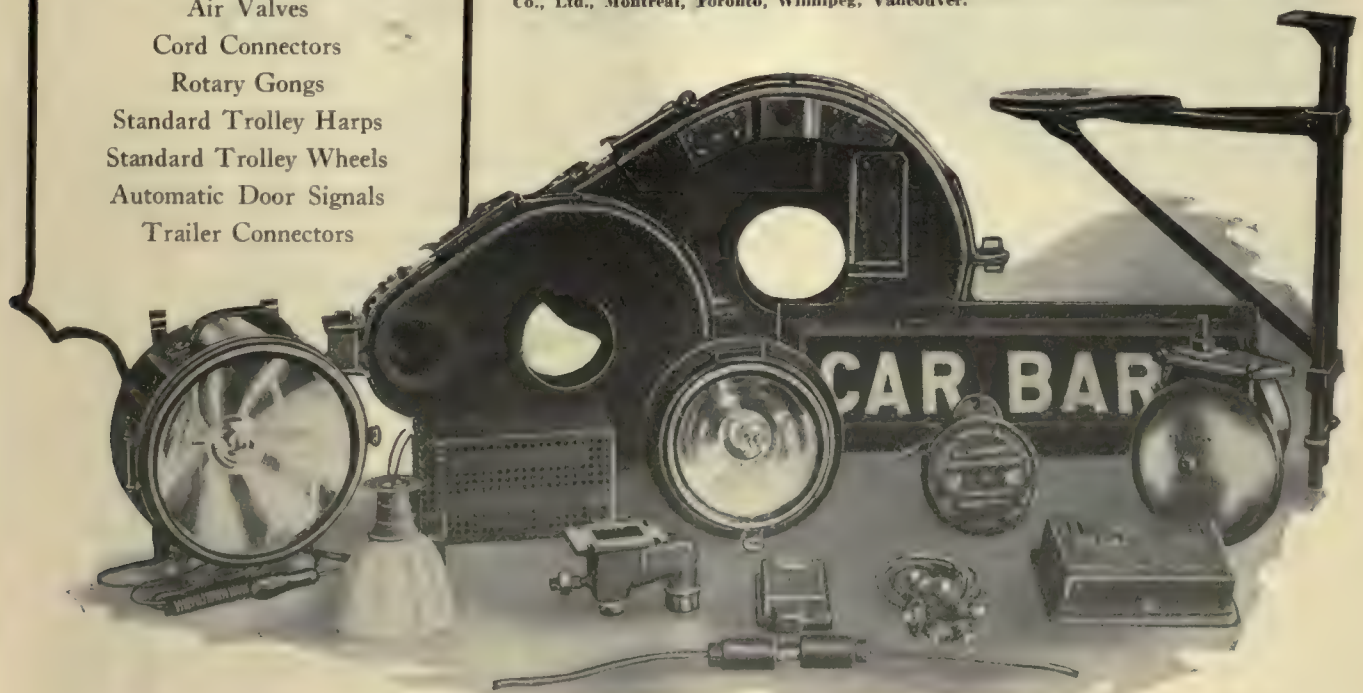
Manufacturers of Railway Material and Electrical Supplies

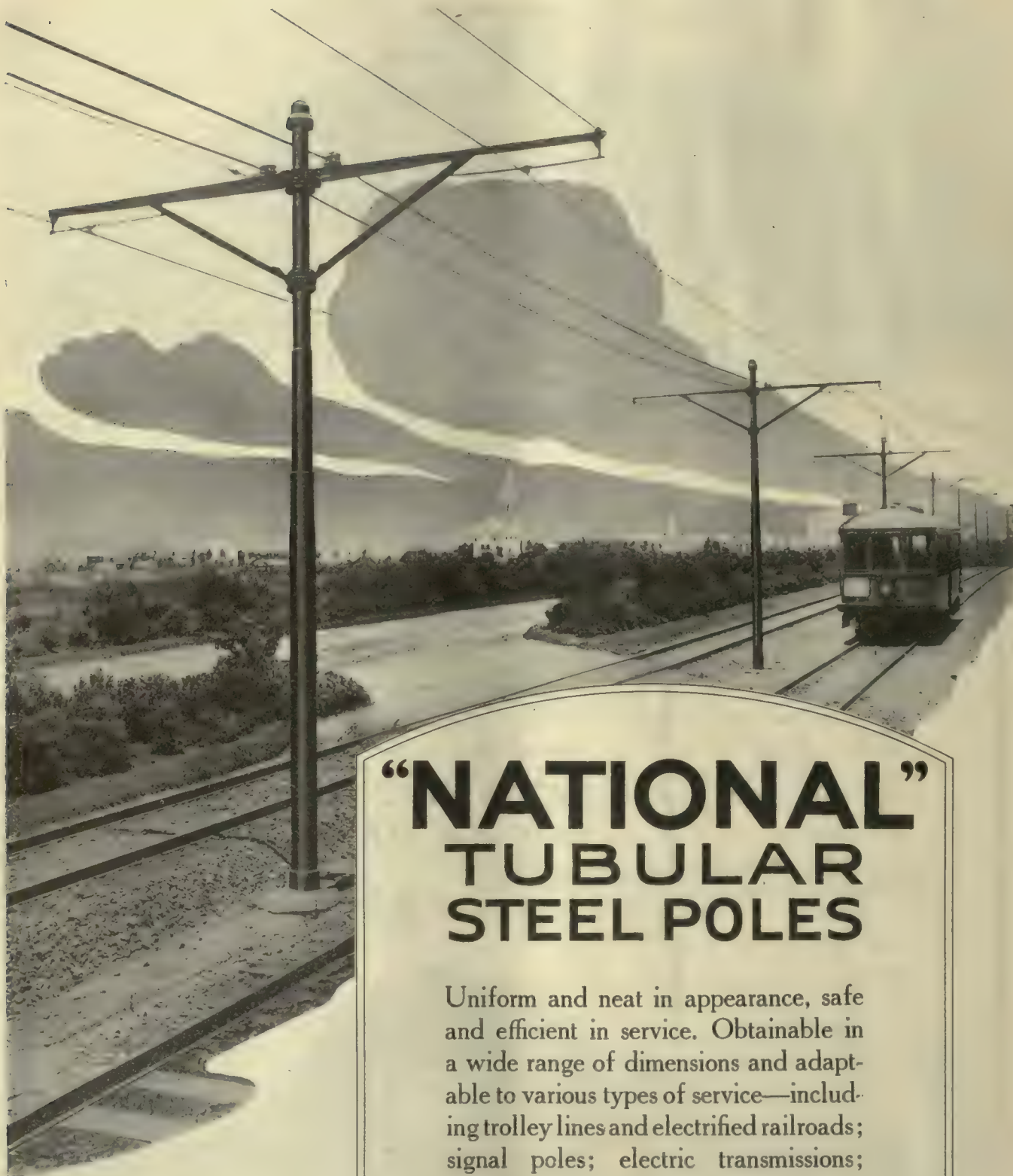
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National Pneumatic push-button control placed at car ends permits guard to control *two* cars at once; and there are outside buttons for station guards, too.

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These National Pneumatic Specialties Can Be Used by You

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Motorman's Light Signals

Safety Interlocking Door Control

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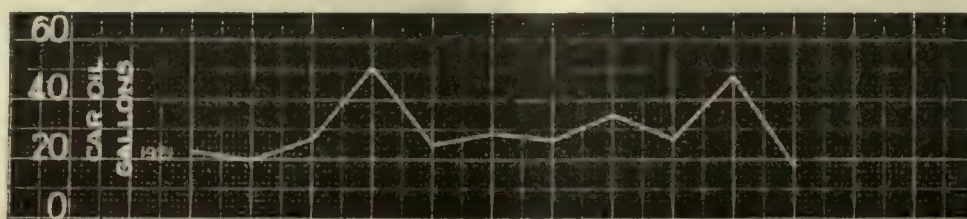
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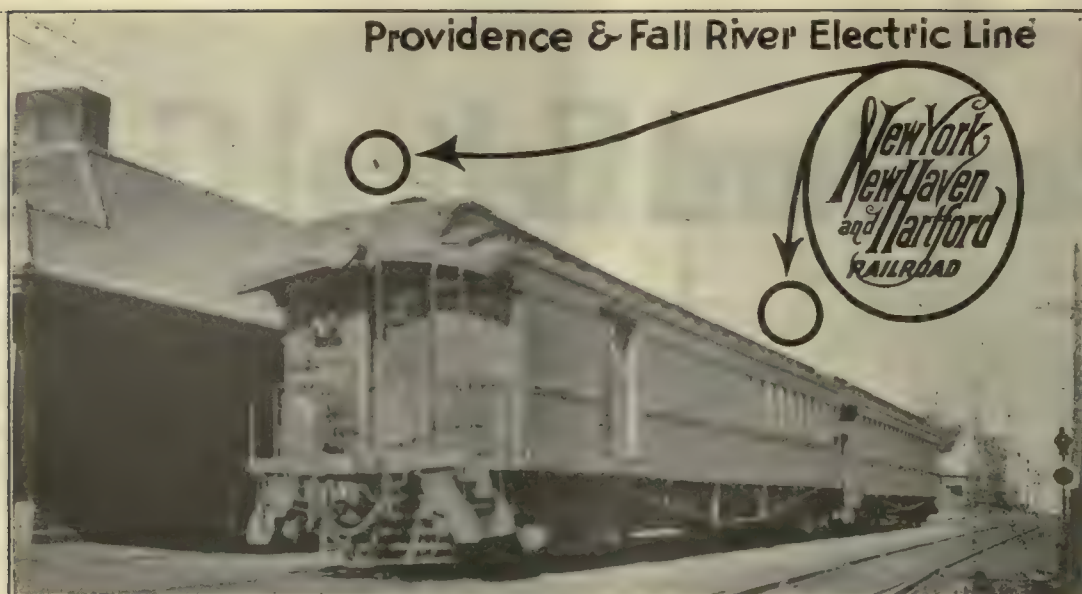
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It Meets Every Requirement for Increased Efficiency

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Eliminates destructive arcing.
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Miller Trolley Shoe Company

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Our engineers prescribe the right oil for the right place and the kind exactly adapted to climatic conditions.

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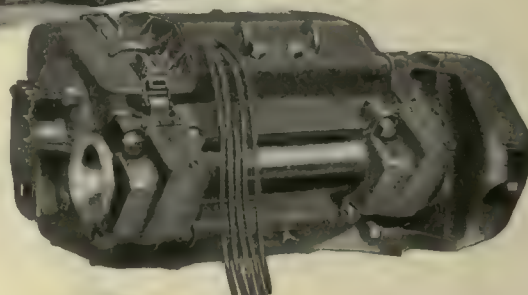
Today interurban electric lines, properly equipped, can successfully compete with steam railroads



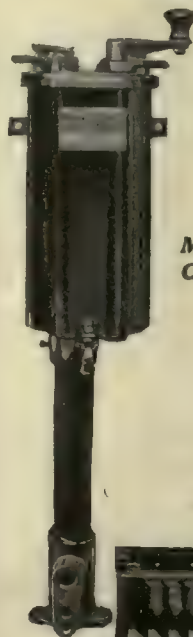
Dixie Flyer

THE Interstate Public Service Company has recently equipped its lines with the most modern high speed cars, designed to provide maximum passenger comfort and to make the run between Indianapolis and Louisville with a material saving in time over the fast steam trains.

General Electric substations, G-E-254 motors and PC-12 control are contributing to the success and reliability of this service.



G-E 254 Motor



Master
Controller

Motor Controller with cover off



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Volume 59

New York, Saturday, March 11, 1922

Number 10

"A Bond in Every Home"

MRS. FUNK, with her "Bond in Every Home" slogan, which she suggested at Indianapolis last week, has certainly hit pretty close to the mark in her answer to the public relations question. And she told how to do it too—sell to the women, the great sentiment makers of the country.

It was a happy arrangement of speakers at the mid-year dinner. Mr. Ainey, the commissioner, placed the responsibility for public utility operation on management, unhampered but advised by commissions, and pointed out that it was principally through the human factor that problems were solved; Mr. Insull, the owner and manager, placed his full reliance on good "public relations," and Mrs. Funk told how the fundamental desire of both could be obtained through the women.

Women, she said, are interested in the things of local interest—electric railway service, electric light and telephone service. This is, then, the great opportunity for electric railway men. This is particularly true just now as women are taking their place as voters and as women are more and more investing their own money and having a voice in the family's investments.

It was interesting to note the general nodding of heads and other indications of approval among the railway men at the dinner as Mrs. Funk drove these points home. Women are not to be neglected; in fact, if the women can be satisfied, electric railways will have solved "public relations."

Will this idea be capitalized? "A Bond in Every Home"—the women can help put them there!

Some Real Progress on the Overhead Crossing Specifications

THAT was a remarkable gathering of representative engineers which was held in New York City on March 2, under the auspices of the American Engineering Standards Committee, to consider the revision of existing overhead crossing specifications. And the result of the conference was even more remarkable, for a unanimous agreement was reached to co-operate in making such a revision.

Why was this a remarkable result? It was so because the particular subject under consideration was one regarding which there have been widely diverging views. The controversy has been going on for a dozen years. This was possibly the first time that so immediate and complete an agreement has been reached in a technical conference on so vital a subject.

Now, why all this hubbub in the matter of crossings of power lines over other things? Simply this: "The people whose property was to be crossed have wanted the overhead construction to be made ultra-safe. Those who were to do the crossing wanted to do the work cheaply. These points of view are necessarily conflicting; if allowed to control, they inevitably lead to deadlock. This is a consummation known in mathematics as *reductio ad absurdum*. But crossing must

be made, and all that is needed is a reasonable factor of safety. The New York conference shows that a definition of "reasonable" is due to be reached soon.

The American Engineering Standards Committee provides a forum for the discussion of matters of this sort. It furnishes auspices under which conflicting interests can get together without sacrificing dignity. The result in this case augurs well for future co-operation.

Once Again "No Confiscation"

NO MATTER in what manner or on what point of law a case is brought before the Supreme Court in which a question of confiscation of private property, whether devoted to public use or not, must be determined, the court seems always to uphold the sacred principle of non-confiscation without due process of law. The latest example is the "80-cent gas case," the Consolidated Gas Company of New York being the particular company and the legal question being the constitutionality of the New York State law fixing the price of gas at 80 cents per 1,000 cu.ft.

In affirming the decision of the lower court the Supreme Court spoke in no uncertain terms; in fact, it spoke with much stronger language than is its wont.

While the details of the case are of interest, the one thing of importance to other branches of the public utility business is that this merely adds one more bit of evidence, one more piece of assurance, with reference to the legal and moral power to resist confiscation at the hands of uninformed or unprincipled public officials. A continued maintenance of this policy, which seems fully assured, is of course in the very best interests of service to the public. It is only with a feeling of such security that public utility operators can do anything worth while in developing the stability of their properties and in maintaining a satisfactory service.

Turning the Tables in Paving

IT IS not hard to prove to anybody and everybody that the indirect paving tax is a monstrous, obsolete injustice, but it is quite as impossible to get any one to bell the paving cat as it was to bell the original cat after the mice conclave of the famous fable. On the other hand, there is usually frank admission by automobile interests that the paving wear caused by rubber-tired vehicles is not fully compensated by taxation.

Is there no way of belling the paving cat other than stepping up to him frontwise? Yes, there seem to be several ways of sidling up to this terror-striking creature, and the weapon is the motor bus itself! Not long ago, as reported in these columns, a community confronted by the substitution of shuttle bus for direct railway service came to the sudden conclusion that it would rather see the rails renewed than taken away forever—so much rather, indeed, that it waived the paving charge then and there.

Now comes another story. An engineer was addressing a group of the city's most influential men on the modernizing of the local transportation system. He dwelt upon the necessity of more cars for the better routes and of motor bus substitution for cars on the thinner but worn-out rail routes. At the close of the meeting one of the members stepped forward to say privately to the speaker that inasmuch as the city had appropriated but a limited amount for new paving it would be desirable to have advance information as to the exact route of the proposed bus services. Arrangement would then be made to spend the paving funds where they would be of most good to the new transit system! This was real co-operation, for no matter how the municipality might feel toward the elimination of the street railway paving tax, it had no power to amend what is practically a state contract. On the other hand, the fact that the local company was going to operate motor buses gives the city the opportunity to show its good will in a most substantial way, since good paving is the first essential toward economical and attractive motor-bus operation. But the moral? Two strings to a bow are better than one.

Better Materials and Better Methods Are Needed in the Shop

A WALK through the repair shop of an average railway gives an impression of inefficiency in spite of the small number of hard-working men present and the excellent shop system in force. There are apparently too many worn axles and wheels, too many broken or cracked pinions and gears, too many burned field coils or armatures. The railway operator has devoted long hours to his task in trying to keep going without any money, and the worker is liable to feel that he is working under some great handicap in regard to the materials furnished. One sometimes wonders if the manufacturer of railway materials has also been forced by economic conditions to curtail the research and study necessary to bring about desirable improvements in quality.

At quite frequent intervals in the columns of this paper articles on manufacturers' tests and inspection of railway material have been printed. In these an attempt has been made to demonstrate the great care that is exercised by them to insure the maintenance of a high standard of quality. The manufacturer is just as vitally interested in having his materials give good service as is the operator. He realizes that one of the essentials of sound business is to give satisfactory service, and this can only be accomplished if the highest grade of material enters into his product. To offset this fact, at the present time, without doubt, materials are subjected to more severe conditions than ordinarily. In fact the severity of electric railway operating conditions is continually increasing. The present conditions of heavy overload and deferred equipment and track maintenance add one more element of stress to the equipment parts.

There is one point that should not be lost sight of, however, namely, that the scrap heap is an excellent place to study weaknesses of material, and the equipment of electric railways at the present time is certainly in a condition to afford valuable data. The battle-scarred motors, axles, pinions, gears and truck frames will afford suggestions for improving the situation.

Every economy counts and if a better grade of steel, a better lubricant or method of lubrication, a better method for installing and maintaining gearing can be

developed by the manufacturer in co-operation with the railway shops, then every encouragement should be given to research work of this character.

Real Reasons for Being Optimistic

PRESIDENT TODD is optimistic on the outlook for the future. Some there are who will say: "Well, he ought to appear to be even if he really isn't." But he is, and he has real reason to be. In so far as the so-called exigencies of the occasion would permit, Mr. Todd quoted a few statistics at the meeting at Indianapolis to prove that his attitude is properly taken. He looked at a cross-section of the industry for his enthusiasm. Along with most other companies Mr. Todd's own company has suffered in recent years. But he has not allowed that fact to dim his appreciation of the general change for the better that is taking place. The process of recovery for the industry is slow, but it is sure. The latest available association statistics prove it. Necessarily, these are some months old, but the facts they brought out are being substantiated in the annual reports for 1921, now being published. Individual managers here and there may have wished for better results, but the figures are distinctly encouraging.

Both Boston companies have turned in accounts for the year that show remarkable results. In Philadelphia Mr. Mitten hopes to go back to paying dividends after having earned \$1,807,292 net in 1921. In Pittsburgh the receivers showed an increase in net of \$1,073,046. In Columbus arrangements are being made to liquidate back dividends on preferred stocks by increasing that issue and returning to regular payments. In Louisville the showing is distinctly encouraging, although it may not be all that Mr. Barnes could have desired. In San Francisco the reorganized Market Street Railway has been placed on a dividend-paying basis. These are a few instances taken at random. In many places plans are being made to care for the deferred maintenance of the war-time period. Thus in Brooklyn \$1,000,000 is to be spent in 1922 on track alone. In Boston the Elevated is planning to spend \$4,000,000 the coming year.

It was a gruelling experience that the electric railways endured during the war time, but reviewed in the light of the frightful record of industrial companies all over the country during 1920 and 1921, the public utilities have certainly proved their claim to stability.

Concrete Evidence of a More Healthy Financial Condition

SIXTY-ONE of sixty-two electric railway companies in the Middle West which have purchased supplies from a certain manufacturer since Jan. 1 have paid cash within ten days of delivery and obtained the 2 per cent discount thereby. In addition to the indications mentioned above that the electric railways generally were getting on their feet, this nearly 100 per cent record of companies discounting their bills is indeed encouraging evidence of a healthy state of finances. It means that there is a widening margin between revenue and operating expenses, thus providing some surplus with which to work and making it possible to take advantage of such economies as the cash payment discounts. This concrete evidence of a general financial improvement of the industry is most reassuring to both railways and the manufacturers whose welfare is dependent on that of the railways.

Nashville Traffic Survey Completed

City, State and Railway Join in Making a Comprehensive Study of the Vehicular and Passenger Traffic—
Ross W. Harris Employed to Make the Report—He Used Methods Similar
to Those Followed by Him in Memphis Survey

WHY is it that so many traction line managers do not seem to appreciate the value and importance of a highly developed schedule organization and close regulation of service? In Nashville the city, the state commission and the Nashville Railway & Light Company have recently co-operated in a survey of traffic on the railway, with the idea of better car routing to handle this traffic with a minimum of expense and delay. Some drastic rules will have to be made affecting the parking of automobiles in the business districts so as to enable the trolley car schedules to be materially increased. This survey was conducted by Ross W. Harris, consulting engineer, Madison, Wis. It is in two parts. In the first the objects sought and the recommendations made are outlined. The second part gives the results of the observations upon which the recommendations are based.

The report has been submitted to the city and the commission, but as yet no final action has been taken to accept the report as a guide nor to put the recommendations into practice. The methods suggested are similar to those which Mr. Harris recommended in his report on the Memphis situation and which have been adopted and put in effect by the receivers of the company, the city of Memphis and the state commission.

An abstract of the Nashville report follows:

INTRODUCTORY

The primary purpose of a street railway system is to transport passengers to and from their places of employment. It is to this business that the street railway must look for its most substantial form of revenue. In addition to the habitual car riders, there are certain passengers who demand railway service when the weather is good and others when it is bad. Still others are transient and have no resident connection to the territory served. Other elements of service might be termed "indirect." Under this heading come those elements that have a bearing on the social, industrial and commercial welfare of the city. The laboring

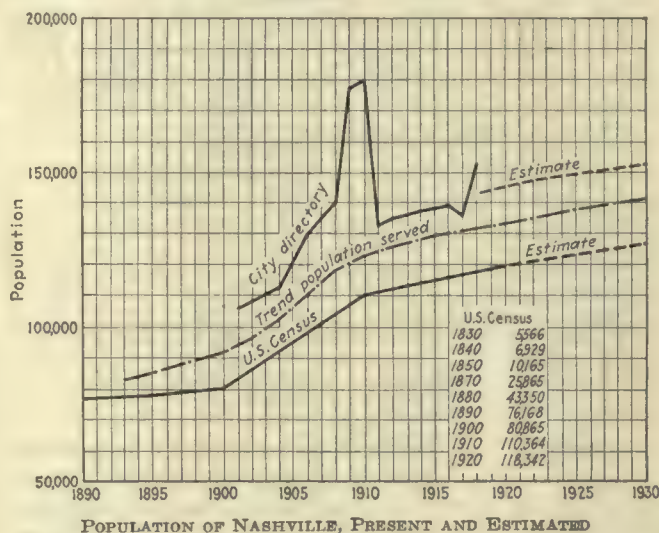
TABLE I—SHOWING PER CENT OF TOTAL AREA, POPULATION AND TRAFFIC CONTRIBUTED

Zone Number	By Half Mile Concentric Zones Centering at Public Square		Per Cent	
	Total Area	Total City Population	Per Cent	Total Traffic Contributed
1	4.29	4.99	46.92	
2	12.85	19.53	11.00	
3	19.79	30.85	11.32	
4	23.43	24.18	11.67	
5	16.70	10.48	7.06	
6	11.33	4.14	3.61	
7	5.37	2.11	2.61	
8	3.36	2.03	3.24	
9	2.28	1.18	0.77	
10	0.60	0.51	1.39	
11			0.05	
12			0.02	
Outside 12th			0.34	
Total	100.00	100.00	100.00	

people constitute the regular riders, and to them the street railway is a convenience and a necessity. These people constitute the backbone of the community and their convenience comes first when the question of service is considered.

The automobile has been developed to a remarkable degree during recent years and some have said that it would greatly impair the usefulness of the street railway. This theory has not been supported by experience, for, concurrent with the increase in the number of automobiles, street railways have expanded, and there is substantial evidence of their continued development. The street railway of today is more firmly imbedded in the life of the community than ever before.

Early in the history of street railways in Nashville the longest possible ride for a single fare was slightly



more than 1.5 miles. Now it is slightly more than 14 miles. Thus with the increasing demand for urban transportation the increase in facilities for rendering service has been a substantial aid to the development of the city in a social, industrial and commercial way.

Street railway service is rendered in large units and thus serves transportation demands with greater ease and less congestion than can the automobile. Even if automobiles were economically possible, the capacity of the streets would be insufficient to accommodate the myriads of small units necessary to serve many thousands of passengers who demand service collectively in short periods of time. No method has ever been suggested and proved practical that is cheaper than trolley car operation.

The problem of transportation is not merely one for the street railway company alone. It should claim the serious attention and constructive co-operation of the public, car rider, operator and investor so that its future may be assured to the benefit of the community.

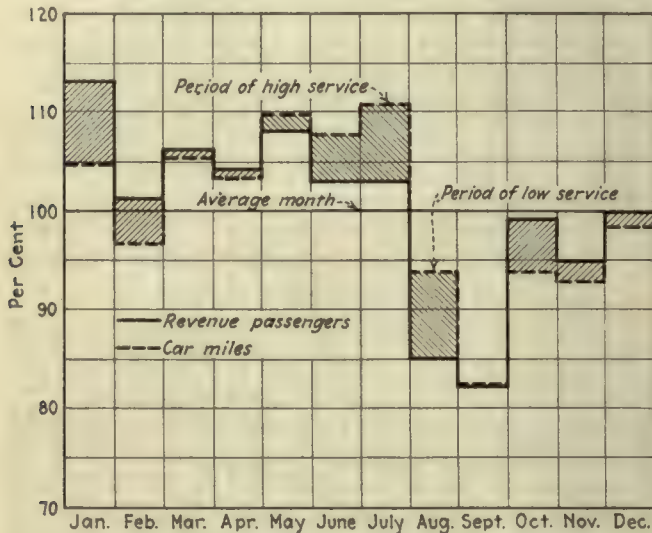
RESULTS SOUGHT

As a result of a six months study of traffic conditions in Nashville, recommendations are made in order that the following results may be obtained: (a) General improvement of street car service; (b) relief of congestion in the downtown district; (c) greater reliability of street car service; (d) increase of schedule speed of cars; (e) improvement of efficiency in the use of cars

and a distribution more nearly in proportion to the volume and direction of traffic and its time of occurrence; (f) freer movement of traffic and better use of the carrying capacity of downtown streets; (g) further development of the central business district.

RECOMMENDATIONS

As a guide for distributing service, periodic checks of traffic on each route should be made during rush hours each week, not including Saturday, and at least once a month on Saturdays and Sundays by a permanent force of trained inspectors. From this



TRAFFIC AND CAR-MILES COMPARED WITH MONTHLY AVERAGE FOR YEAR

information there should be determined for each route, just prior to the beginning of each month, an equitable daily line standard that is seasoned with good judgment and policy and predicated on an equitable relation between fare, rate of cost, volume of business, physical conditions along each route and the immediate future business outlook. These standards should be a guide for determining the total car mileage to be operated for each route.

Every effort should be made to establish a system of flexible schedules that can be readily changed on short notice. Such schedules should be limited on one side by the readiness-to-serve element of service and on the other by an equitable relation of the elements of car service. The daily car mileage over that required for readiness-to-serve service should be distributed proportionately to traffic as to its volume, length of ride and time of riding. This traffic may be indicated by that observed at points of maximum loading in excess of that accommodated by cars in readiness-to-serve service.

Ordinances forbidding parking of automobiles on certain downtown streets should be passed immediately. Limitation of the time of parking is alone not sufficient owing to the increasing number of cars. The downtown parking privilege is an extravagant use of valuable roadway to the great disadvantage of moving vehicles, for which purpose street capacity is primarily intended. Left-hand turns should also be prohibited in the downtown districts.

The coupling up of lines which now enter the downtown district from opposite directions and have similar traffic characteristics into single through lines is not

only desirable from the standpoint of service and economical operation but is necessary to avoid congestion that would result from looping all cars in the business district.

Many cars are now operated to the ends of the lines, while the average ride of the passengers is much shorter. This results in many vacant seat-miles and many standing passenger-miles.

The characteristics of street railway travel are such that seat-miles are always in excess of passenger-miles. Nevertheless the proper distribution of service will reduce this ratio to a minimum, consistent with reasonable, adequate and efficient service. The situation therefore justifies the turning back of cars, after readiness-to-serve service is taken care of and whenever physically possible, before they reach the terminal of many of the present routes.

In a small city a central transfer station is advantageous, but the station in Nashville today offers facilities which are inadequate for the traveling public. In other words, the city has outgrown the transfer station.

If the service-at-cost plan is instituted, it is implied that the public is entitled to all the service that a given fare will pay for. That is to say, the patrons of any line are entitled to all the service their patronage will pay for, considering the operating cost and the relation that their line bears to all other lines.

Any change in the present system of routing will make necessary changes in the operating routine followed by the company. Such adjustments are far reaching and can be brought about only by a gradual process. It is advisable that a system of rerouting be put into effect at the earliest practical date that will relieve the present excessive congestion and improve service without materially changing the relation of the system to the present business district.

Report on Traffic Conditions

LAYOUT OF CITY

The city of Nashville has a population of 118,342, residing in an area of 18.44 sq. miles. In addition, several thousand people live just outside the present city limits. The topography is irregular, there being many steep grades, ravines and streams. Many of these grades are in the downtown district where the congestion is greatest. Their presence emphasizes the necessity of safe operation.

The city centers approximately at the Court House and service must be rendered in four directions. The population is very dense in the immediate downtown section. The manufacturing district as well as the residential sections are widely distributed. The streets are narrow at points where the flow of traffic is greatest, and this offers a serious problem that must be solved. Otherwise it will remain a decided handicap to the future development of the city.

The population statistics are shown in the accompanying diagram. The trend of population for the next ten years has also been projected. This estimate is equivalent to an annual increase of 0.56 per cent each year for the next ten years. If the city should be divided up by concentric half-mile zones centering at the public square, 31 per cent of the population will be found in the third zone, or that between the mile and the 1½-mile circle. Ninety per cent of the population lives within 2½ miles of the center of the city. The population density for the whole city is 6,415. The most densely

populated zone is No. 3, which has an area of 3.65 sq. miles and a population density of 10,000. The extent to which these zones contributed to the riding is shown in Table I.

Due to the many influences that have a bearing on the development of riding habit, such as the area of the city, the distribution of population, the relative location of the car rider from his point of employment, the quality of service rendered, the rate of fare, etc., it is very difficult to draw a comparison of the riding habit of one city with that of another, for the reason that the controlling factors are not effective alike in any two cities. There is a prevailing tendency, however, for the riding habit to increase as a city grows. This is evident from an analysis of the statistics for the past seventeen years. In 1903 the rides per capita in Nashville were 139, and in 1920 they were 255. It is estimated that in 1930 the figure will be 332.

VEHICULAR TRAFFIC—PARKING

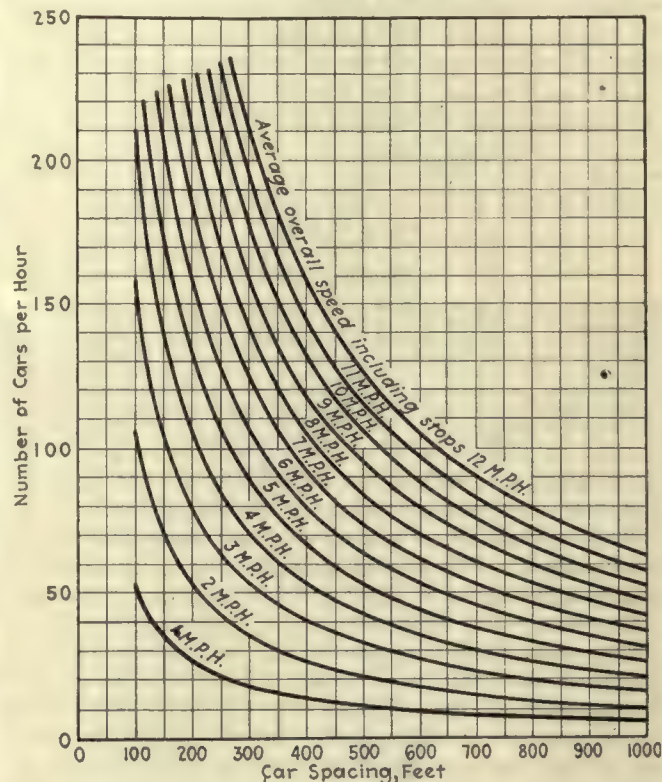
A survey was made of automobiles parked on the streets in the downtown district between 2 p.m. and 5 p.m. on April 15, 1921. At 2 p.m. there were 1,668 parked vehicles, 36 per cent of which were on streets having car lines, and at 5 p.m. there were 1,372 parked vehicles, 40 per cent of which were on streets having car lines. If each automobile complied with the one-hour parking law there were 1,725 automobiles during this time entering or leaving parking spaces on streets with tracks, and twice that number (3,450) of chances of delays to vehicles and cars in these three hours.

Stop-watch observations indicate that about twenty-five seconds are required for an automobile to enter or leave its parking space. Applying this to the aggregate number of vehicles, it would require 1,438 minutes, or twenty-four hours, during the three-hour period to park these automobiles.

In cases where street cars had actually to stop or slow down on account of automobiles entering or leaving parking places the observed average duration of a street car stop was ten seconds, and an average loss of six seconds when a car was required to slow down. The total loss of time when a car comes to a full stop, including that due to drifting and accelerating under such conditions, is twenty seconds.

With these figures as a basis it is estimated that the delay on account of cars having to stop when passing

begin to move with greater frequency, and it is during this period that street car traffic is greatest. Thus the ill effects of parking become more serious. If the parking of automobiles was not permitted, particularly on streets having car lines, much more space would be available for moving vehicles and this would aid the free movement of the street cars. This would also result



THEORETICAL TRACK CAPACITY, ONE TRACK IN ONE DIRECTION PER HOUR

in improvement of the reliability of the street car service, increase in the speed of cars and greater economy in the cost of operating, thus making better service possible.

CARRYING CAPACITY OF STREETS

A survey of the amount of street space available for moving vehicles on the downtown streets was made, with the idea that the railway strip should be entirely reserved for railway passengers. On 31-ft. streets, measured between the curbs, even with single tracks, it was found that when there was automobile parking the space remaining for vehicular traffic was not sufficient to permit cars to pass moving vehicles. The same was true of a 40-ft. street with double tracks.

With the elimination entirely of parking on such streets, the capacity would naturally be greatly increased, and if figured on the basis of one vehicle per foot width of roadway per minute, it would be many times what was actually observed.

An analysis of Table II will indicate that with parking prohibited the normal capacity of the street is far from being used, even with the track space reserved for the exclusive use of street cars. It follows that not only does the parking privilege deprive the moving vehicles of a large share of the use of the street but it also necessitates the use by automobiles of the space which should be given over to the car rider, particularly during rush hours. Further, the parking privilege, as it now prevails, seriously inconveniences the public at

TABLE II—SHOWING TRAFFIC CONDITIONS IN DOWNTOWN SECTIONS

	Width of Street Curb to Curb (Feet)	Width of Car Zone (Feet)	Total Width Outside of Car Zone (Feet)	Normal Vehicular Street Capacity (15 Min. Period)	Parking Allowed	No Parking	Observed Vehi- cles, Max. 15 Min. Period
Third Avenue...	31.5	8.2 (S.T.)	23.3	0	0	349	126
Fourth Avenue...	31.5	8.2 (S.T.)	23.3	0	0	349	103
Church Street...	33.2	17.8 (D.T.)	15.4	0	0	115	107
Eighth Avenue...	40.0	17.8 (D.T.)	22.2	0	0	166	94
Broadway.....	80.0	19.4 (D.T.)	60.6	357	454	188	
Deaderick.....	55.2	18.3 (D.T.)	36.9	179	276	74	

through the downtown district on Church Street, Fourth and Third Avenues from 2 to 7 p.m. daily amounts to one hour and twenty-four minutes. Similar analysis shows that on account of cars having to slow down due to interruption they lose two hours and six minutes. This estimate does not include delay to street cars that is caused by the reduction of street area caused by parked automobiles.

During the evening rush hour the parked machines

large by reducing the amount of carrying capacity available for the use of all street traffic. It must be apparent therefore that privileges accorded the parked automobile are a serious handicap to serving the public requirements properly and cause an inefficient use of valuable street capacity.

There is but one conclusion to be drawn from this analysis, and this is that there is need of more capacity for moving street traffic. Two major plans are available: The first involves street widening, thereby giving

certain streets be reserved principally for the use of street cars and others be used by the faster moving vehicles.

STANDARDS OF SERVICE

In a general sense, street railway service can be said to have two purposes. First, to transport passengers, and, second, to aid in the development of a community. There are also two ways of fixing the standard of service. The choice between these two depends on the answer to the question: Shall service be determined by the existing fare, or shall the fare be made adequate to meet the cost of the service demanded by the public?

Any service standard that does not take into consideration the constantly shifting relation between revenues and cost of service falls short of the purpose for which it is intended. In the past it has been quite common to attempt to establish a standard based upon an average load or number of seats per hundred passengers applied over a given period of time. These methods, however, have not proved successful for the reason that they are not conducive to efficient operation, neither do they guarantee an equitable relation between service, fare and cost.

A standard of service that is based upon the rate of fare, revenue, riding habit, cost of service and distribution of traffic demand in such a way as to maintain an equitable relation between revenues and cost should be developed somewhat as follows: Make an estimate of future revenue for several months, preferably a year, and from this deduct first an amount to maintain the integrity of money invested; that is, a sum sufficient to cover returns, renewals and replacements, maintenance and a small marginal profit and loss. The balance, after an amount is deducted to cover taxes, comprises all the money available for service.

BASING MILEAGE ON MONEY AVAILABLE

The next step is to determine the aggregate mileage that this amount of money will pay for at the prevailing rate of cost, then distribute it to the various months according to seasonal conditions and requirements. The amount of aggregate service thus allocated to the months may next be allotted to each of the various

TABLE III—COST OF SERVICE AND EXCESS SERVICE, 1920

	Per Cent of Average Month							
	Revenue Passenger	Service	Service Excess Over Revenue Passengers	Car Miles Average Month	Excess Mileage	Operating Expense Exclusive of Taxes, Cents per Car-Mile	Cost of Excess Service	
May.....	108.10	109.99	1.89	461,524	8,723	31.2339	\$2,725	
June.....	103.04	107.69	4.65	461,524	21,461	32.8584	7,052	
July.....	103.02	110.73	7.71	461,524	35,584	32.8061	11,674	
August.....	85.09	93.99	8.90	461,524	41,076	38.0215	15,618	
Total.....					106,844		\$37,069	

These 106,844 miles if run in 1920, say July, would cost 32.8061 cents each, or a total of \$35,037.

more space, but such a plan would involve an enormous expense and require extensive readjustments of the downtown district. For this reason its practicability is questionable. The second plan is to obtain additional street capacity by a more efficient use of the present street capacity. This can be accomplished in one of three ways. The car tracks may be removed entirely from certain streets. Second, automobile traffic may be removed entirely. Third, a combined restricted use of the streets by both automobiles and street car traffic can be brought about. This last plan will least inconvenience the public. The regulations regarding parking should be revised, and automobile traffic should be diverted from street car arteries by opening new routes and improving street paving on those streets. Rerouting street cars will also help.

Cases have been noted where one automobile with one passenger has delayed three cars. Many cases have been noted where three or four automobiles have delayed ten or fifteen cars. The average automobile during the rush hours has two passengers, and a small number of people in automobiles can delay a large number riding on street cars. It is thus clear that, taken as a whole, automobile parking delays the movement of many thousands of people daily, and thus increases the cost of rendering street car service, which in turn argues for a higher rate of fare. These delays are most noticeable during rush hours when the maximum number of passengers are inconvenienced.

On Eighth Avenue between Church and Commerce Streets observation on April 21, 1921, showed that out of a total of 906 vehicles but 14 per cent were commercial cars and wagons, all the remainder being pleasure vehicles.

Cars are bulky and require a lot of space. They make frequent stops and at times are slow moving, whereas the automobile is a fast-moving conveyance, not large in size, and cannot render its best service and move freely without danger among the slow-moving street cars. This is especially true in narrow streets, and under such conditions the cars, moving slowly, limit the rapid transit possibilities of the automobile. In turn the car rider is inconvenienced by the great number of automobiles. Hence it is most desirable that

TABLE IV—TOTAL SEATING CAPACITY OF CARS IN VARIOUS CITIES

	Date	Amount	Density Population per Square Mile	Area Served, Square Miles	Total Seating Capacity Per 1,000 Population	Revenue Per 1,000 Passengers
Nashville...	1921	134,000	7.267*	18.44	52.8209†	0.207†
Memphis...	1920	185,000	7.520*	24.6	55.946†	0.217†
Minneapolis	1907	276,000	5.208	53.00	60.935	0.249
Detroit.....	1906	367,000	10.295	35.65	71.531	0.267
Milwaukee...	1904	307,000	13.644	22.50	37.817	0.211
Columbus...	1911	187,674	9.268	20.25	70.116	0.240
Indianapolis	1906	206,000	7.043	29.25	56.898	0.232
Toledo.....	1914	184,126	6.461	28.50	64.505	0.266
Kansas City	1904	239,000	9.192	26.00	75.372	0.269
St. Paul....	1907	204,000	3.676	55.50	35.382	0.169

* Includes trend population outside city limits. Density city only 6,602 in Memphis and 6,415 in Nashville.

† Closed equipment only.

‡ 1919 revenue passengers in Memphis and 1920 in Nashville.

routes, and this in turn distributed to weekdays, Saturdays and Sundays, according to the conditions and requirements of each route.

Having thus distributed the service, a line standard can be formulated in the form of earnings per car mile for each route for each month of the year on a weekday, Saturday and Sunday basis. By such procedure all the underlying factors relating to fare, cost, traffic demand, etc., are centralized in the unit "earnings per car-mile." Then, reports of earnings and service for each of the

routes furnish a basis for determining the current earnings of any line, and by a simple division of this amount by the unit "earnings per car-mile" the largest amount of mileage that should be operated on a given date will be indicated.

With the amount of mileage fixed for each line on a given day thus determined, the next problem is to distribute it along the line and throughout the day. This is a matter of schedule design. To do this deduct from the daily mileage justified by earnings the mileage

sibility of changing rates of cost of service, makes it advisable that the line standards be determined just prior to the beginning of the month for which they are intended. Such a procedure, it is believed, will distribute service equitably and give to the public all the service a given fare will permit, and to the company assurance that the integrity of its investment will be protected, all of which lends itself to furthering the development of the community.

Whatever service will result from such a procedure must be such as to encourage riding and meet a test by the public as to whether it is satisfactory. Should such service be demonstrated to discourage riding and be unsatisfactory to the public, the rate of fare must be raised immediately a sufficient amount to permit service at cost that will meet requirements.

TABLE V—MINIMUM TIME SPACING

	Church Street, All Points, Seconds	Church Street Between 4th and 5th, Seconds	Church Street Between 5th and 6th, Seconds	Church Street Between 6th and 7th, Seconds
1. On account of car ahead: service stop..	25.000	25.000	25.000	25.000
2. On account of car behind: safety requirements:				
a. Personal element of motorman (decision to act).....	3.000	3.000	3.000	3.000
b. Retardation (half time required for).....	1.810	1.035	1.165	1.915
c. Acceleration (half time required for).....	1.810	1.035	1.165	1.915
d. Time required to run 5 ft. at initial speed.....	0.629	1.099	0.977	0.593
Total minimum time spacing.....	32.249	31.169	31.307	32.423
Use—Seconds.....	32	31	31	32
Distance spacing—feet (initial speed x seconds).....	173	96	108	184
Initial speed, m.p.h.....	5.42	3.10	3.50	5.75
Initial speed, feet per second.....	7.95	4.55	5.13	8.43
Rate of acceleration and retardation m.p.h. per second.....	1.50	1.50	1.50	1.50
Seconds to accelerate or stop car.....	3.62	2.07	2.33	3.83

required on each route to maintain the "readiness-to-serve" element of service, and the balance may then be distributed along the line in a manner somewhat proportional to the length of ride and the distribution of the number of passengers passing the point of maximum loading over and above the number of seats scheduled to pass the point of maximum loading in the "readiness-to-serve" service.

The application of an equitable service standard, as outlined above, requires an efficient schedule department, the duties of which are to collect regularly and systematically observations of traffic requirements at the point of maximum loading and to design schedules in accordance with the standard of service. Difficulties that may accrue when schedules are changed may be overcome by the construction of fabricated schedules, built up in such a manner that each part, in effect, is a schedule complete in every detail but of such nature that each part may be changed without reference to any other part yet still gear in with all other parts forming the complete schedule.

ONLY THE METHOD OF FIXING A SERVICE STANDARD CAN BE PERMANENT

An equitable working standard of itself cannot be permanent for the reason that any one or more of the factors that govern it may and do vary in value and degree of effectiveness. The method of determining a service standard and distributing service, as outlined, requires constant supervision and adjustment on account of variation in the cost of service, changes in the price of materials and labor, the variation of traffic demand, etc. This means that each route will have a standard "earnings per car-mile" which may differ in amount from other routes for the reason that the traffic characteristics will vary the distribution of the available mileage. Likewise each month may have different requirements, and this, together with the pos-

LIMIT OF LOADS

Subject to the limitation of service the loads carried past the maximum loading point over a twenty-minute period should not exceed regularly the normal capacity of the car, i.e., the seating capacity plus one standing passenger for each 3 sq.ft. of standing area. Further, no regularly occurring maximum load should exceed the emergency capacity of the car, which is the seating capacity plus one passenger for each 2 sq.ft. of available standing area.

When two or more types of cars are operated on the same route the capacity of all types involved should govern the average load, but in the case of regularly occurring maximum loads the emergency capacity of the type of car involved should govern.

Recent changes in the economic conditions of the country have been far reaching and have brought about marked decreases in the purchasing power of the dollar and increase in the cost of labor and material. In many lines of industry increases in the prices of commodity have kept pace with the general trend of economic conditions. This is not true in the street railway industry, where materials and wages have increased by large margins without corresponding increases in the rate of fare.

The car rider usually rides at least once every day. This brings to his attention, through his pocketbook, any real or fancied grievances against the transportation system. The car rider has been inclined to view with disfavor any fare increase. In fact, rather than permit an increase he has been content with a lower standard of service. The standard of service now acceptable would not have been satisfactory before the recent change in economic conditions. Thus, the standards of today must be such as will harmonize with a public conception of service much different from that which existed a few years ago.

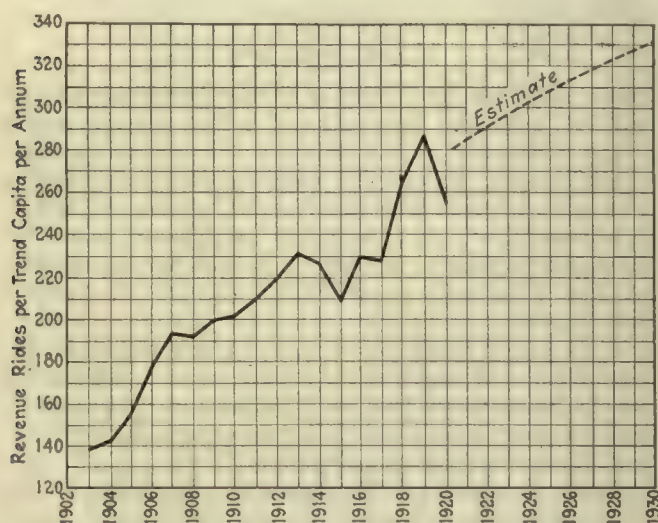
CONTROL OF SERVICE

The demand for service is not at all constant. Variations frequently occur without warning, sometimes by long swings, and frequently by peaks. Superimposed on the increase due to increase of population there may occur seasonal, industrial, weekly or even daily fluctuations. The cost of service must be counter-balanced by revenue originating from traffic demand, as a matter of equity, and outside of the mileage required for the "readiness-to-serve" element of service.

Any lag in putting into effect reduced service after a decline of traffic is a needless expense, and similarly any lag in properly increasing service with an increased

demand is to withhold from the public justifiable service. Much money may be needlessly expended if service does not closely follow the demand for it in an equitable relation. Reference may be made to the diagram on page 396 that illustrates the relative variations of traffic and service on a comparable basis where each month is expressed in a percentage corresponding to the average month for the year under consideration.

To all practical purposes the percentage of service should follow that of traffic, as this is most conducive of equity. With this in mind, the exact service operated and estimated expenses incurred are shown for 1920 in Table III. In all probability the variation of mileage involved in this table is due to short-hour cars. A car that operates twenty hours per day may cost \$2 per



RIDING HABIT IN NASHVILLE, PAST AND ESTIMATED

car per hour, while one that operates but two hours per day will cost a great deal more, possibly as much as \$8 per car hour. Without making a careful analysis of the service cost for short and long-hour car operation it has been taken as reasonable that a car-mile of a short-hour car will cost three times as much as the cost of the average car-mile for the entire system.

CHARACTERISTICS OF TRAFFIC NECESSITATES SHORT-ROUTING OF CARS

Seldom will a car be loaded to its full capacity through an entire trip. Few passengers ride from one end of a route to the other, and one seat will often accommodate more than one passenger, on a complete trip. Analysis has shown that each route from the center of the city to the outlying districts in Nashville has three distinct zones, a central, a transmission or neutral, and an outer zone. The central zone is located in the business district. The neutral zone, which is just beyond the central zone, contributes less revenue than the other zones, as fewer passengers board the cars there, but in this zone there are usually more passengers riding than seats. It is in this zone that the cars experience their greatest instantaneous load. The outer zone, which is beyond the neutral zone, lies chiefly in the residential district, and here are found the greatest number of vacant seats. The rate at which passengers leave and board the cars depends on the local characteristics of each route, but in any event the load on a car making an outbound trip decreases soon after the neutral zone is left to such an extent that seats become vacant. On a percentage basis, the outer zone fur-

nishes 91.22 per cent of the traffic, the neutral zone 6.42 per cent and the central zone but 2.36 per cent.

An analysis of the data relating to standing passengers and vacant seats shows that there are 5,920 standing passenger-miles, found largely in the neutral zone, and 19,340 vacant seat-miles, chiefly in the outlying zones. In other words, there are 3.27 vacant seat-miles for each standing passenger-mile. A similar survey in the city of Minneapolis in 1912, at a time when the service was considered good, indicated 2.44 vacant seat-miles for each standing passenger-mile. If a comparison is made with these figures, Nashville operates 34 per cent more vacant seat-miles for each standing passenger than Minneapolis, where short-routing of cars is used extensively. In a similar survey made in Memphis, where short-routing was not extensively used and where at the time of the survey service was not considered good, there were 3.57 vacant seat-miles for each standing passenger-mile. In Memphis short-routing of cars will be used more extensively in the future with service distributed more nearly in accordance with "when, where and to the extent" of traffic demand, thus resulting in less vacant seat-miles and better service.

It has been found that the distance that each passenger will ride approximates one-half of the average distance that each car travels when making a one-way trip. The average length of ride in Nashville was determined by observation of all day traffic to be 1.91 miles. A passenger who transferred was considered as having one ride on each line used.

The seating capacity of cars ranges from thirty-two to fifty and averages thirty-nine seats. Excluding open cars that average forty-two seats the average is thirty-eight seats per car.

A series of counts has been made of passengers standing in different sections of the car while in service, and the amount of standing area has been accurately determined by measurements. It has been found that passengers will arrange themselves when standing as follows:

Place	Observed Average Standing Area
Front vestibule, one passenger for each.....	4.17 sq.ft.
Front aisle, one passenger for each.....	4.19 sq.ft.
Center aisle, one passenger for each.....	3.17 sq.ft.
Rear aisle, one passenger for each.....	3.50 sq.ft.
Rear vestibule, one passenger for each.....	4.11 sq.ft.
Car as a whole, one passenger for each.....	3.66 sq.ft.

Guided by these figures, which represent the general run of conditions, 3.5 sq.ft. per passenger has been adopted for use in computing the normal standing capacity of cars. It can be said, therefore, that the closed cars will accommodate on the average twenty-five standing passengers, which is 65 per cent of their average seating capacity. In emergencies, however, standing passengers will voluntarily arrange themselves to occupy much less space. The results of an observation as to the minimum standing space required for passengers is given in the following table:

Place	Observed Minimum Standing Area
Front vestibule, one passenger to each.....	1.02 sq.ft.
Front aisle, one passenger to each.....	1.28 sq.ft.
Center aisle, one passenger to each.....	1.24 sq.ft.
Rear aisle, one passenger to each.....	1.13 sq.ft.
Rear vestibule, one passenger to each.....	1.05 sq.ft.
Car as a whole, one passenger to each.....	1.62 sq.ft.

On the basis of these results the emergency capacity for standing passengers is computed on the basis of 2 sq.ft. per passenger. Table IV gives a comparison

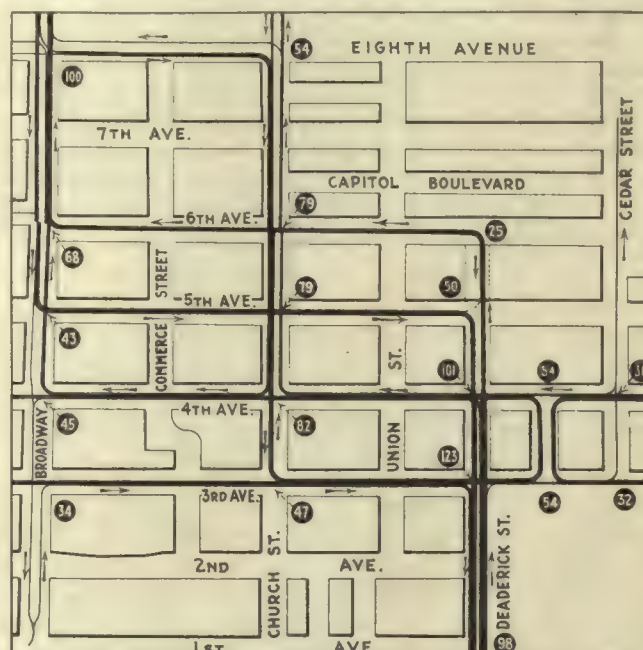
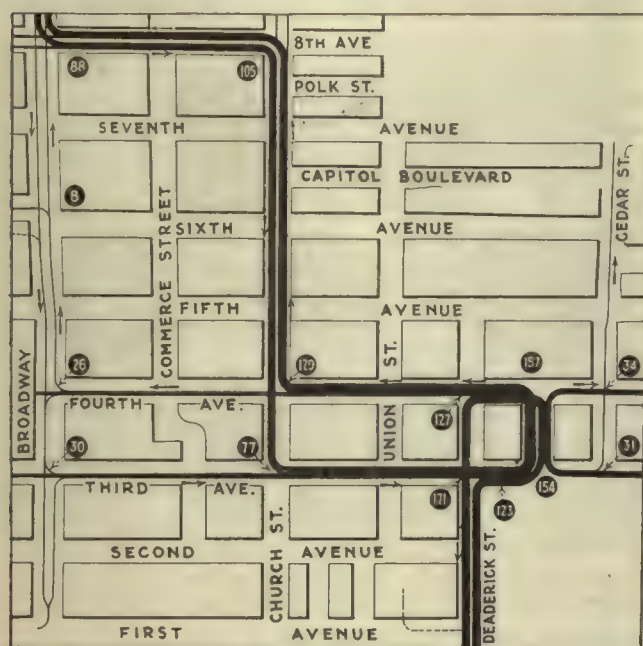
of the total seating capacity available for Nashville with that of other cities. This indicates that Nashville has proportionately the same amount of equipment capacity, but it does not follow that Nashville has too little or too much capacity, for the local standard of service is the controlling factor.

TRACK CAPACITY

The capacity of track is measured by the number of cars that can be moved over it in one direction during a specified time. This number will depend largely upon local conditions. Under ordinary rush-hour traffic conditions good service and economic operations demand the greatest number of cars per hour be such that any

this basis free movement of cars implies that the time spacing between them should not be less than the average length of service stop, plus the time required for the next following car to make a full safety stop of short duration, from initial speed. If there is less time spacing than this, speed, free movement, service reliability or track capacity, or any two or more of them, may be sacrificed, thereby increasing the cost of service and reducing its quality.

On a basis that all cars in the downtown district make all regular stops, the minimum time-spacing between cars should not be less than the time required for the service stop, plus the time for the next following car to make a safety stop (which includes the time lost



MAPS OF DOWNTOWN SECTION IN NASHVILLE SHOWING FORMER AND PROPOSED ROUTING OF CARS

one car will not interfere with the free, safe and rapid movement of any other car.

Track capacity can be defined as follows:

1. Maximum track capacity is the greatest rate expressed in cars per hour at which cars may be operated over one track in one direction without any special consideration for speed, movement of cars or quality of service. If such conditions were to prevail for any considerable length of time good service could not be maintained.

2. Normal track capacity is the greatest rate in cars per hour at which cars may be operated, conducive of free movement, safe operation and reliable service. Under such average conditions good service is possible, although there would not be track capacity to care for much increase of traffic and continued good service.

3. Normal rerouting track capacity is that rate expressed in cars per hour adopted as a standard in questions involving the rerouting of cars, having in mind not only those factors involving good service but also the providing of sufficient track capacity over and above present requirements to provide for the accommodation of future increased service requirements.

If good service is to be maintained cars must move freely. Interference with the free movement of cars by vehicles and other cars must be avoided wherever possible. In Nashville in the downtown district all cars stop at regular points for receiving passengers, and on

while it is coming to a full stop and accelerates to initial speed), plus the time required for the car to run at initial speed, a distance equal to that required between cars when stopped, in service, on the main line track. Table V shows certain minimum spacings figured out on this basis.

SPEED OF CARS BETWEEN STOPS

The average speed between stops varies somewhat with direction, time of day and location. On Church Street during the evening rush hour the average out-bound speed was 4.92 m.p.h., the highest speed was 10.77 m.p.h., the slowest speed was 0.97 m.p.h. and the slowest half-hour average speed noticed for one direction was 3.1 m.p.h. Average half-hour speeds at these times range generally from 3.5 to less than 6 m.p.h., and seldom exceed 6 m.p.h., while in places it is close to 3.1 m.p.h. At such speed cars will be passing a given point in one direction at a rate of about sixty per hour. A comparison between Nashville and Memphis in this particular is of interest. Memphis has an average speed of over 10 m.p.h. with cars passing at the rate of 150 per hour. Complaint has been made that the service in Memphis is poor, but if this is so with this average speed and number of cars per hour, what should be said of the service in Nashville, where the speed is one-third and the car passage almost one-third that in Memphis.

In any consideration of the above it should be borne in mind that the speeds given are maximum speeds obtained between stops and not over-all speeds including stops, which are much less.

LENGTH OF SERVICE STOPS

During rush hours, that is from 5 to 5:30 p.m., the average stop is 18.27 seconds. Of the service stops observed 33 per cent were longer than twenty seconds, and the major portion of such observations were less than thirty-five seconds. However, an occasional stop was observed to be as long as forty seconds, but rarely sixty seconds. Eighty per cent of all service stops noted during rush hours did not require more than twenty-five seconds.

During non-rush conditions even a greater portion of stops observed required less than twenty-five seconds. Since rush hour conditions are the more severe, they must be given primary weight in the matter of track capacity, and, having in mind the factor of service reliability, twenty-five seconds is set as the proper duration of a service stop to be used in connection with the determination of normal track capacity.

NORMAL CAPACITY OF TRACK

At least 5 ft. of free space is considered advisable between cars when stopped and standing on a main line track, as in a blockade. This practice varies somewhat between companies, for some use only enough space to permit one pedestrian to pass between the cars while others allow considerably more.

Many factors influence the number of cars that may be operated on a given track in one direction. If the space on the tracks between consecutive cars is used by vehicles, then the extent to which the full theoretical track capacity may be utilized is materially affected. Hence, when arriving at a particular figure to be used as track capacity the question of practicability in its relation to influences other than those having their source with street cars must be considered.

On Church Street between Fourth and Fifth Avenues, if cars move freely, they might be spaced as close as 135 ft. apart and run at the observed average maximum rush-hour speed between stops of 3.1 m.p.h. However, cars were found to be spaced on an average of 230 ft. apart, or 95 ft. more than required as a minimum safe distance spacing. To this extent the theoretical track capacity at a speed of 3.1 m.p.h. is denied to the car rider, due largely, if not entirely, to vehicular traffic.

IMPROVED METHODS FOR REGULATING VEHICULAR TRAFFIC NECESSARY

The automobile today is practically the exclusive user of the street outside of the street car. The street car is confined to a certain part of the street, while the automobile is adaptable to more varying conditions. Street capacity, particularly on the narrow downtown streets in Nashville, where low speeds are noted, are used very extensively by parked automobiles, and because of the narrow streets the only space left for moving vehicles is on the street car track interspaced among the street cars. In such cases the street car must then proceed, limited in its movement, by conditions as to the vehicular traffic. The solution as to increased speed involves an adjustment of parking privileges and regulations as to the movement of vehicles. The good of the public, and particularly the interest of the car riders, demands an early adjustment of methods of regulating vehicular traffic.

Artistic Fare Tokens Command Premium

Besides Solving the Change Problem These Fare Tokens Are Much Sought After By Tourists and Collectors as Souvenirs

BY DIPL.-ING. K. SIEBER

Manager of the Nürnberg & Fürth Street Railway, Nürnberg, Germany

IN PROPORTION to the decline of the value of money in Germany during the last few years, an increasing want has been felt for small coins for change. First, the gold and silver coins disappeared; then, the copper and nickel coins went, too. Even the supply of iron coins which followed could not be maintained by the



GROUP OF FARE TOKENS IN NÜRNBERG. THE REVERSE SIDE BEARS THE NAME OF THE COMPANY AND THE WORDS "20 PFENNIG"

federal mints. Cities were then authorized to issue paper fractional currency for change. This helped some, but did not relieve the situation fully. The amount of the money thus issued, especially the metal money, was not sufficient, and much of it was retained by collectors, and found its way even beyond the boundaries of Germany. The paper currency, issued for small denominations, such as 10 and 25 pfennigs, proved inconvenient to handle. Moreover, it soon became damaged beyond use.

The street railway companies in Germany constantly urged their patrons to have the correct fare always ready, but the constant scarcity of change made it impossible for them to conform with this request. This reduced the fare receipts considerably, as the conductors could not make change in many cases. This trouble gave several street railway companies the idea that they might issue their own metal money, a plan which turned out quite well.

In Nürnberg, too, the lack of small coins for change was felt. At first the idea of a coin or token to represent "a fare" was considered, but it was rejected because of the large initial cost of coining such a token, and the fact that the frequency with which fares are apt to change made the life of any token rather short. In the spring of 1921 it was decided to reduce the cost of these coins by using their reverse side for advertising purposes. We had already orders for these "ads," but had to abandon the idea on account of the unstable financial conditions at that time.

In the meantime the lack of small change became more and more acute, and in April, 1921, it was decided

to issue octagonal aluminum coins of 20 pfennig denomination, on the reverse side of which would appear interesting views of Nuremberg and Fürth, such as of the memorial statues, fountains, busts of famous artists, etc. These coins were to be used as change and were given for such by the conductors upon presentation of a note of high denomination. The fares were then 60, 80 and 100 pfennigs for rides of respectively 3, 6 and more than 6 km. The coins were valid as currency only of course for street car travel. They were legal tenders to no one else, but we had the right to refuse a ride if the passenger could not present the exact legal fare.

At first the public accepted the new coins with interest but without enthusiasm. The coins came partly back to us, but their use became current also, against our intentions, in retail business transactions throughout the city, though some merchants refused to accept them in payment of goods or for change.

The first issue was 50,000 of each kind. Then the design on the reverse side was changed. Some of these coins turned out to be very attractive and popular in design, and this fact awakened the interest of collectors. Tourists, passing through Nuremberg, liked to take along a "set" of these coins as a souvenir, so that the demand for them increased at such a rate that the manufacturers of the coins, who were undergoing a metal shortage, could not keep up with the demand.

Soon a regular exchange value of these coins was established. It is said that some of them sold at a premium of 2,000 per cent or more. At some of the principal street corners, on racetracks and at other sporting places temporary exchanges were established for the purchase and exchange of the street railway emergency money. For every kind of coin a special value was established, according to the rarity of that

Most of the conductors used the coins to secure for themselves a large amount of change money. They gave, for example, one mark in coins and nine marks in paper money in return for ten marks in change.

Various manufacturers became interested and made up and sold rapidly neat holders for this emergency money. Bracelets and other adornments were made out of the coins.

All told, forty-five different types of token were issued. What is of greatest importance, however, was that the number of travelers on the street railway increased considerably. Many a passenger took a ride on the street railway with the tacit hope of getting one of the rare emergency coins. Otherwise he would have walked. A further value of the tokens lies in the fact that they advertise Nuremberg. Its beauty is carried by them to all parts of the world. Not only were beautiful views of the city circulated in this way, but people were made familiar with the names of such famous men as Albrecht Dürer, Hans Sachs, Peter Vischer, Wenzel Jamnitzer, et al. As a last, and maybe not the least, advantage may be mentioned that in the minds of the populace was awakened an interest in their own country and their own famous past. The school board, in particular, reported that the pupils were greatly helped in learning about the history of the famous men of Nuremberg.

The demand for these coins is very large up to today, but it would be impracticable now to get out a new edition, as the cost of making such coins at the present time would be more than their face value.

Mercury-Arc Rectifier for Bern-Muri-Worb (Switzerland) Electric Railway

DUE to the large increase of traffic on the electric car line connecting Bern, Muri and Worb, Switzerland, it was necessary to enlarge the capacity of the feeding substation at Worb. This contained two 100-kva. motor-generator sets, transforming 15,000-volt, three-phase, 40-cycle current into 650-volt direct current for the road, and operating in parallel with a 330-cell, 259-amp.-hr. storage battery. The contemplated enlargement of this station would have called for an additional 200-kva. unit, and at the same time an increase of the direct-current voltage from 650 to 750. It was also intended to change over from 40 to 50 cycles. The new generator would have had to be wound so as readily to permit of these two changes.

After studying the different possible methods which might accomplish the above, the railway management decided to install one large mercury-arc rectifier, rated at 225 kw., at 750 volts direct current. The efficiency of a rectifier of this type, measured between the terminals of the 15,000-volt feeding transformer and the 750-volt direct-current busbars, is stated to be 94.5 per cent at full load, including the consumption of all auxiliary apparatus, and 93.7 per cent at one-quarter load. The rectifier will operate in parallel with the existing motor generators and the battery.

The installation cost of this rectifier will be higher than that of either a rotary converter or a motor-generator set, but the higher efficiency, the possibility of carrying large overloads, the short-circuit-proof performance, the dependable service and the small maintenance cost were deciding features in favor of the rectifier, which will be built by Brown, Boveri & Company of Zurich.



OPEN-AIR EXCHANGE FOR THE PURCHASE AND SALE OF RARE FARE TOKENS

particular coin. Newspapers published poems and short stories dealing with the emergency money, and witty songs were sung on the vaudeville stage to announce the issue of new pictures on coins.

Suddenly the street car conductor became the most popular man in town. Unfortunately, it took but a few minutes for him to be sold out. He was, of course, permitted only to sell the emergency money at par value.

Necessary Physical and Mental Requirements of Platform Employees

How Compensation Acts and Need for Efficiency and Courtesy Are Forcing Electric Railway Companies to Take Steps to Eliminate Applicants Predisposed to Disability—How Far the Examination Should Be Carried Is Discussed and Work on Chicago Surface Lines Reflected

BY DR. JOHN LEEMING

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Professor of Medical Jurisprudence, Kent College of Law, Chicago

PHYSICAL and mental requirements of platform men is a subject that is prominently before us at the present time. Frequent reference is made to it in railway journals and so far as the general employment of labor is concerned medical and health journals are devoting much space to its consideration. Why is this so? Is the situation any different than it was one or two decades ago? Yes—in many ways it is. We are living in a progressive age; we are learning by past experience; we are appreciating more than ever before that efficiency depends largely upon sound mind and body.

One of the most important reasons which have drawn our attention to this subject is the experience we are having under operation of the workmen's compensation acts. Such laws have been enacted in different states in all sections of the country. A few years ago in certain states a street railway company could elect whether or not it would operate under the terms of the act, but if it elected against such operation, then its right to defend itself against damage suits for negligence, for injuries to its employees arising out of and in the course of their employment was limited by the act to the defense of no negligence alone. That is, the defenses known under common law procedure as the doctrine of (a) assumed risk, (b) fellow servant, and (c) contributory negligence were taken away from employers who rejected the act. But now and for the past few years, in many of our states, this privilege of election has been withheld and the business of operating street railways is designated as "extrahazardous." Under these acts it is no bar to recovery by the employee if his own negligence—no matter how gross—contributed to the occurrence of the accident, nor if the accident grew out of the carelessness or negligence of a fellow employee, or was due to a risk incidental to the work. The only question to be considered is: "Did the accidental injury sustained by the employee arise out of and in the course of his employment?" If so the employer is liable for compensation.

EMPLOYER SUPPOSED TO KNOW OF PRIOR TENDENCY TO DISABILITY

There is another feature of the compensation acts which accounts for the use of the word "necessary" in the title of this paper, that is, not merely the desirable requirements but the absolutely necessary physical and mental requirements for street car employees. Many men of suitable age, size and weight apply for service who are apparently sound but are found upon careful physical examination to be suffering from certain latent defects, certain tendencies or predispositions to disease which in themselves may not, at the time of the application, be positively disqualifying for the service but which, under the stress of a slight accident, "arising out of and in course of his employment," may be roused

up and result in a long period of disability—for all of which period of disability, both total and partial, the employer is liable for compensation under these new laws.

These compensation acts while varying somewhat in unimportant details were originally created with the intention of "promoting the general welfare of the employee," and it was recognized as a fundamental principle that compensation should be provided for injuries without regard to the fault or negligence of the employer or of the injured employee. Hence as a matter of self-protection the employer is virtually compelled to make certain that the employee is 100 per cent sound. This will work an increasing hardship on applicants who may have latent defects, perhaps unknown to them. Yet in my opinion such defects are of sufficient importance to cause the applicant's immediate rejection. Labor organizations and others have offered criticism of the strict enforcement of this rule, but such criticisms are well answered by a consideration of the statement of an arbitrator in a recent compensation case when he said in substance in awarding full compensation: "This man's prior trouble was no doubt aggravated by the accident in question and his prolonged disability may have been due to such aggravation. The employer either knew of the pre-existing condition when the man was hired or it was his business to have discovered it."

Out of the many cases coming under my observation of apparently healthy individuals who were suffering from latent defects or constitutional taints which have proved very expensive to the employer I will cite one as an example of what lack of adequate examination means.

Mr. ———, age thirty years, married, conductor. He sustained a very slight injury in trying to close the sliding door of his car, which for some unknown reason resisted his effort. His right hand slipped from the door handle and the back of the hand struck against the door jamb, slightly bruising it. The skin was not broken but some little swelling occurred, and after his day's run a doctor painted the hand with iodine and advised rest for a day or two until the swelling subsided. At the end of two weeks this conductor applied for compensation, claiming total disability, and presented a certificate of disability from a second doctor and friend and this doctor stated that the hand was greatly swollen, the tendons being involved, and that the outlook for permanent recovery was very remote. Request was made for examination by the company's doctor, which was granted, and six weeks after the occurrence of the accident, it was made. The hand was found to be very much swollen and entirely useless; the tendons controlling the movement of the fingers were imbedded in a gelatinous exudate which suggested either a tubercular or syphilitic constitution. A Wasserman test was made of the man's blood, which revealed the fact

that the subject was suffering from syphilis. A course of intensive treatment was instituted at the company's expense which covered a period of four months, at the end of which time the full function of the hand was completely restored.

If the bruise sustained in this case had occurred in a healthy man the disability would not have lasted more than a week at the maximum, but as he was employed with this undetected syphilitic taint, the insignificant accident localized the constitutional disease at the site of the bruise and the employer's oversight in employing a syphilitic was rectified at the expense of several hundred dollars in compensation and medical services.

In addition to syphilis and other chronic constitutional affections, I have encountered serious and costly effects from trivial injury in cases of heart trouble, lessening the power of recuperation after injury; high blood pressure, with apoplexy and paralysis resulting in permanent disability; hernia, made worse and even strangulated by an accidental lift or strain; localized focal infections in the teeth or tonsils, which favor the spread of the poison to slightly injured joints and muscles; varicose veins, which, because of a simple bump or abrasion acting as the exciting cause may bring on a varicose ulcer, practically incurable without operation; functional nervousness, when the shock and excitement attending an injury have proved to be very expensive in so-called traumatic neurasthenia and traumatic hysteria. From costly experience in such cases and many others that could be enumerated, it is shown to be entirely insufficient to reject only applicants for service who present positively disqualifying defects such as color blindness, impaired hearing, structural heart disease, pulmonary or bone tuberculosis, palpable deformity and organic diseases of the nervous system.

SOUND BODY BEGETS EFFICIENCY AND COURTEOUSNESS

Are there other reasons why physical and mental soundness are necessary in transportation service employees? Without question there are many. Our journals and the daily press are constantly pointing out the importance of efficiency, safety and courtesy. How can these qualities be expected in men who are not sound in mind and body? How can a man be expected to concentrate upon his daily work and be civil to patrons under trying circumstances if he is not in good health? The general public is vitally interested in this important matter. It has a right to assume that the operators of our cars are fully competent safely to discharge their duties, and when we accept their fares as passengers we enter into a contract with them to "exercise the highest degree of care reasonably consistent with the practical operation of the road."

The important and practical question arises: How carefully should men be selected and how thoroughly should they be examined? The recommendations of last year's A.E.R.A. committee on personnel and training of transportation employees answered these questions in part; but this year's committee has been asked to pursue still further the same work and also to study the question of psychological and intelligence tests. Last year's committee submitted a minimum requirement which included examination of the sight, hearing, lungs, heart and blood pressure and urinalysis. (See recommendation 4 of committee report).

It is my judgment, based upon experience as indicated above, that this minimum requirement is entirely inade-

quate. It is good as far as it goes but it does not go far enough. It does not take into consideration the question of family history, previous history of applicant as to injury and disease, nature of recovery from prior illness or injury, and a careful study of a possible tendency to recurrence. The same exhaustive inquiry should be made into all possible focal infections in the teeth, tonsils, nasal and accessory sinuses, appendix and gall bladder. A full investigation should be made on the subject of past venereal diseases and their possible after effects, and if the clinical findings remotely suggest a prior syphilis, a Wasserman test should be made. The nervous, circulatory and glandular systems should be minutely investigated for the purpose of detecting any constitutional taint which might lower the applicant's resistance to injury or interfere with normal recuperation and convalescence. In other words, a full, thorough and complete examination should be made—just as thorough as that required by the best old line life insurance companies.

APPLICANT MUST HAVE AVERAGE INTELLIGENCE

The committee on personnel last year gave to the important subject of intelligence examination the following brief reference: "In connection with the physical examination there should be sufficient general questioning by the physician to assure him that the applicant possesses average intelligence and mental ability." Having been honored by being chosen a member of that committee, it goes without saying that I have no desire or intention of offering any criticism of its work, but I do desire to point out that the subject is of such importance that it calls for more careful consideration and further investigation. In justification of this statement I would call attention to the fact that in the examination of men for army service our government used "intelligence tests" in nearly two million cases and the result of these tests furnished valuable information. It is a matter of statistics that out of two million men only 12 per cent of the men so examined were found to be of "superior intelligence"; approximately 66 per cent of the number were found to possess "average intelligence" and over 20 per cent were designated as of "inferior intelligence."

These results compel us to recognize the somewhat unpleasant fact that one in every five of our able-bodied men of suitable age for train service is of inferior mental endowment and is therefore not suitable for the work of handling our passengers and acting in the capacity of our representatives on the cars. The practical consideration which therefore presents itself is at least this: How can this one man in five be eliminated?

In approaching this subject it becomes necessary to inquire, as a preliminary step, what mental and temperamental qualities a competent and efficient motorman or conductor must have.

A conductor should have a good memory, be a close and careful observer, be able to make a correct statement of any unusual occurrence, be accurate in making change, be alert in giving signals and be able to grasp situations quickly.

A motorman should possess intelligence in regard to speed; a keen perception of measurement of distances, a ready response to signals and unusual situations suddenly presented; he should have good mental poise, not becoming easily rattled or excited, able to anticipate danger and act quickly in emergencies.

It is self-evident that we should have a standard,

that having a standard we should maintain it, not taking into our train service a single man who falls below it, and that this standard should be a high one and not any lower than the following:

A good trainman must be a man in the upper half of the 66 per cent class having average intelligence. He must have an alert and well balanced mind, capable of concentration and of forming prompt and sound judgments.

Men of such a standard and possessing these mental qualities are the type of men who are most likely to be courteous and civil, honest and prudent, steady and industrious, even tempered and amenable to discipline. These of course are essential qualities in the men we are seeking to employ.

MECHANICAL DEVICES FOR MENTAL TEST UNNECESSARY

Many mechanical devices have been contrived with the object of enabling the examiner to ascertain the intelligence status of an applicant, and they no doubt have their value. But they are cumbersome and too expensive for the majority of railway companies. When it is remembered that our purpose is to eliminate the one man in five who presents "inferior intelligence," and the lower one-half of the class of men having "average intelligence," it would seem that elaborate mechanical apparatus, electrical contrivances and stop watch accuracy would be unnecessary for a trained and skillful medical man. No criticism whatever is offered, however, if a large company finds value in installing complicated machinery such as that illustrated in the excellent article which appeared in the Jan. 28, 1921, issue of *ELECTRIC RAILWAY JOURNAL*. My only contention is that it is not necessary to have mechanical devices in order to be able to eliminate applicants of less than the standard degree of intelligence.

It should be borne in mind that before the applicant is sent to the medical department, he has been interviewed and passed upon favorably by the employment officer, his photograph taken, his references examined and the questions of his age, height, weight, general appearance and manner fully considered and that by this preliminary interview approximately 70 per cent of the applicants in Chicago are eliminated from further consideration. Following this weeding out process, the remaining 30 per cent are questioned closely by either the superintendent of transportation or the general manager, when another 15 per cent are rejected, leaving only 15 per cent to undergo the physical and mental examination by the medical man. During the past year on the Chicago Surface Lines, approximately 85 per cent of the original applicants for employment in the train service have been refused.

While the examining doctor is spending 30 minutes in making a physical examination, he will have considerable opportunity to size up his man; observe his powers of perception and concentration in replying to questions; consider the accuracy and readiness of his responses in making various movements as requested and of determining his general intelligence and power of judgment. In addition to these observations made by the examiner, it may be desirable to use some well devised intelligence tests. To this end, a list of such tests is now being prepared by the committee on personnel, which will be presented in the report of the committee next fall.

A sample question that will indicate the trend of thought which is being pursued is the following to be

stated to an applicant who applies for work as a motor-man: "If you were operating a car, and while it was standing, you saw a man on the track ahead of you, how would you start?" There are many possible answers to such a question, some of which might give evidence of an utter lack of comprehension, never considering the intervening distance in replying, while others might show good appreciation and understanding of the question, giving answers for different distances, evidencing thereby an intelligent response. A large number of questions or so-called intelligence tests of this character are being prepared for both motormen and conductors.

I believe the subject under consideration is one of great importance and should call for careful study and thought by all employers of labor. If the ideas suggested could be crystallized into a practical and workable plan that would be suitable for general adoption, there is no doubt that it would materially improve the personnel of our train service and result in the employment of a better class of men, both physically and mentally.

It is impossible to foretell the good which might result from such an achievement. Beneficial results would surely be reflected in the increased revenues of the operating companies because the trainmen with "sound minds in sound bodies" would be more courteous and more capable and thus win the good will of patrons. Also by their alertness and vigilance, accidents would be decreased, thus reducing a costly item of expense. And again because of this physical fitness they would be less liable to illness and much less apt to have long drawn out disability because of trivial accidents.

In the present labor market the supply of workmen exceeds the demand, and railway operators have an excellent opportunity to exercise careful discrimination in their choice of employees. Will they use the modern method for making such selections? Good judgment should dictate the answer.

Los Angeles Starts Train Operation



LOS ANGELES ADOPTS TWO-CAR TRAIN OPERATION

ALL-DAY operation of two-car trains on one of the local lines of the Los Angeles (Cal.) Railway was begun on Jan. 30. Ten trains are run on the line together with single cars, giving a ninety-second headway in the rush hours and four-minute mid-day service.

The cars used in train service are of steel construction with an inclosed center section and open sections at the rear and front. They seat fifty-four passengers and have cross seats throughout. They are equipped for multiple-unit operation with Westinghouse air brakes and two 526 L Westinghouse motors. Twenty-five of these cars have been purchased. They were designed by the engineering department of the Los Angeles Railway.

Letters to the Editors

Valueless Valuations

NEW YORK, March 6, 1922.

To the Editors:

The recent valuations of the street railway systems in New York City, as published by the Transit Commission, recall the statement made by the late Charles A. Prouty, who was, until his untimely death, director of valuations in charge of valuating the steam railroads under the valuation act. After four years of work, he testified before the Interstate Commerce Commission: "I would rather undertake to recite the Chinese alphabet backward than read the valuation act, because it does not mean anything after you have read it."

It may safely be stated, as the *New York Times* said some time ago, that valuations do not mean anything either. If the rates of return suit the companies they care little about valuations; if the rates of return are inadequate both the rates and valuations are subjected to litigation. In the present instance the Transit Commission is apparently seeking legislative assistance to bolster up its valuations by making them mandatory and forcing their acceptance before any consideration is to be given to future rate questions. This looks like a confession of weakness and lack of faith in the valuations, while the seeking of legislative assistance leads to another saying of Mr. Prouty's: "We can regulate the railways but we cannot by legislation force one single dollar of private capital into railway investment against its will."

The futility of physical valuations has been demonstrated in one way or another on almost every street railway system in the country. No better illustration of their worthless character is needed than that of which the writer has knowledge wherein a firm of engineers of the highest standing prescribed values for certain pieces of property which, according to their report, should have become worthless and vanished three years ago; but the property is still in operating condition and giving satisfactory service. Such occurrences in valuations, however made, are the rule rather than the exception.

That street railways have a value to the community far beyond any physical valuation that may be placed upon them is clearly indicated by the many instances where cities and towns have bought defunct systems in order to preserve the very life and sinew of their civic existence. The strong protests from the public against the abandonment proposals of the Transit Commission covering various lines in Brooklyn are further evidence of the existence of what may be called the uncapitalized civic value of the street railway. This clearly has no direct relation to the physical value of the railway but it does represent a form of intangible value or good will which may not now be capitalized by the railways, although every form of so-called private business is permitted to and does place a value on itself as a going concern. All municipalities base their valuations of real estate for assessment purposes upon the values created by the street railways. The debt limit of New York City would be vastly reduced if it were not for the increased valuations which are based on transit facilities of all kinds.

The Transit Commission was apparently created, and has announced its intention, to conserve and preserve the street railway systems of the city, in the realization of the fact that they are a vital factor in the conduct of the business and social life of the community. Its present course in creating a means for long-drawn litigation through the medium of the valuation scheme which it has sponsored, combined with the poorly devised scheme of abandonment of lines, will not lead to an early settlement of the momentous questions at issue.

"ENGINEER."

Comment on the Standard Safety Car

UNITED RAILWAYS & ELECTRIC COMPANY OF BALTIMORE
BALTIMORE, MD., March 6, 1922.

To the Editors:

I do not like to bring up what is apparently a dead subject but I want to take this means of calling the industry's attention to Order No. 462 of the Public Utility Commission, District of Columbia, dated Feb. 27, on the subject of one-man car designs.

The commission has recently approved the operation of one-man cars in the district but, in its order, has taken exception to the narrow, combined entrance and exit feature of the so-called safety car and has stated as follows:

Experience has shown that the particular type of equipment so far used has not been entirely satisfactory, owing mainly to the limitation of the entrance and exit facilities. These were originally provided in accordance with standard one-man safety car practice, but it has been found that peculiar local conditions demanded more commodious means of ingress and egress. In the latest type of one-man car placed in operation separate entrance and exit doors have been provided together with additional facilities to add to the comfort, convenience and safety of passengers.

I am merely bringing this up in order that no more mistakes will be made in the purchase of a car that cannot help but be unsatisfactory, and I am referring to the so-called standard safety car, with the narrow entrance. The more we run the correctly designed car in Baltimore, the more we realize the shortcomings of the so-called standard safety car.

H. B. FLOWERS,

Second Vice-President and General Manager.

Changes in the Cost of Living in Latter Part of 1921

CHANGES in the cost of living in five cities were given out recently by the United States Department of Labor through the Bureau of Labor Statistics.

City	Per Cent of Decrease from	
	June, 1920, to December, 1921	September, 1921, to December, 1921
Chicago	19.7	1.7
Detroit	22.7	3.0
New York	18.7	0.9
Philadelphia	18.4	1.0
Washington	19.0	1.9

The above table shows the decrease in the total cost of living in each city from June, 1920, and September, 1921, to December, 1921.

According to the *Electric Railway and Tramway Journal*, whereas twenty years ago the Leeds (England) Tramways Committee passed a resolution limiting the loading of a car to eight more than the seating capacity, it has, by a recent resolution, increased the number to twelve.

Electric Railway Publicity

Devoted to How to Tell the Story

"Verily I Say Unto Thee"

A Protest by a Minister at Little Rock Against Reducing the Cost of "the Cheapest Thing We Have," the Street Car Ride

"**V**ERILY I say unto thee, thou shalt not by any means go out thence, until thou hast paid the utmost farthing." With this quotation as his text Dr. J. W. Coontz, pastor of the First Methodist Episcopal Church at Little Rock, Ark., delivered a homily on Sunday evening, Feb. 19, to his parishioners on the subject "Why Reduce the Cheapest Thing We Have?" The announcement by the minister of the subject of his sermon was made through the public press. It was prompted by the passage by the Council a few days previously of an ordinance giving the Little Rock Railway & Electric Company thirty days in which to reduce its fare from 6 cents to 5 cents under its franchise.

YOU MUST PAY FULL VALUE

In explaining the text Dr. Coontz said Christ meant that no one should expect anything without paying full value for it. He started his talk by saying that he did not know any men who worked on the cars, nor was he acquainted with any officials of the railway company. He was too poor to own an automobile and had to ride the street cars every day, so no one could accuse him of being biased or not affected by any increase. He stated that he wanted the privilege of expressing his honest views on the subject. He continued his prefacing remarks by stating that he loved the Mayor of the city and the members of the City Council, but, in this particular case, he did not think their judgment was correct. They were making a mistake. He stated that the company could not possibly exist with a 5-cent fare without lowering the wages of the employees or greatly curtailing the service. He, for one, did not care to ride on the street car, at a reduced fare, knowing that the employees on the car were helping to pay for his ride from their own earnings, nor did he want to see the service curtailed.

He stated there was still a further argument why he did not want to see a 5-cent fare, and that is that he would not want business interests to say, "We can make money with a street car system at Hot Springs, Fort Smith, Pine Bluff and other places, but we cannot in Little Rock," and he would have to admit that the Little Rock Mayor and City Council would bring about such a condition.

He also said that the city was growing and that patrons wanted the railway extended into the suburbs. How could the public expect the company to do this, he asked, if the railway did not know positively that it was going to be permitted to make a profit. He did not know the amount of the investment made by the company, locally, but assuming that it was \$250,000, he felt that it was very nice to be able to borrow the use of \$250,000 at any time of the day for the price of a fare. Dr. Coontz

also called the attention of his parishioners to the fact that when he boarded a car he felt very gratified to know that he had 200 men working for his convenience for the price of a single fare.

Dr. Coontz said that in all the cities with which he was familiar the railway companies had been receiving a fare of more than 5 cents. Surely, he said, "all these other Mayors and City Councils cannot be wrong while our men are the only ones that are right." This particular case reminded him of the story of the old lady who had a boy in the army—they were all marching in parade and she stood watching them, and when her boy came along in the procession she remarked: "They are all out of step but John."

The local banks got 8 per cent interest plus brokerage on loans, and Dr. Coontz said it would be foolhardy arbitrarily to tell the banks from now on they must charge only 7 per cent interest and no brokerage. He also used as an example the matter of fire insurance rates. If the City Council were now arbitrarily to name a fire insurance rate that existed, say, twenty years ago, when the losses were not near so heavy as they are at present, the companies would soon be broke. He also asked what success might attend an attempt by the Council arbitrarily to demand that real estate be sold at a price no greater than property brought twenty years ago. Even assuming that a profit had been earned from the sale of light and power it was not right to make up the loss from the operation of the railway from the revenues of the lighting department.

COMPANY DOESN'T MISREPRESENT ITS PRODUCT

Members of the Council handed merchants the privilege of getting out and making as much money as their ingenuity made possible and never so much as looked at the merchants' book. Merchants were permitted to represent goods as they pleased, telling the purchaser that he was getting an all-wool suit when the suit was mostly cotton. Here Dr. Coontz cited specific instances and then concluded: "And do you ever hear of the electric railway trying to sell you a ride and giving you a walk?"

He said that the night before he delivered his sermon he received a special delivery letter from a woman in Little Rock who stated that she had no affiliation with the railway, but was very glad to learn that he was taking a stand in defense of the company. This lady said that all through the war the company operated without an increase in fare under heavy expenses and hardships and had been unable to get relief until just recently and she did not think the company was being treated right. The company should be made to live up to its contract, but it could not be expected to do so and not to make money. In short, his motto was: "Be fair to the company and make the company be fair to you." These illustrations used by Dr. Coontz in closing his remarks were all drawn along the line that "You cannot expect happiness, success or wealth or a future in Heaven without paying full fare for any of them."

Go Right and You Will Be Safe!

Rule of the Road Changed in Vancouver Without Confusion—
Publicity Played Prominent Part in Educational Campaign

SAFETY, safety, safety, but the greatest of these is safety! This is the message with a thousand variations which the British Columbia Electric Railway, Vancouver, B. C., spread broadcast throughout the province for many months in order to prepare the public for the new year's change in the rule of the road. The work the company did in familiarizing automobilists, pedestrians and railway passengers won the praise of the Vancouver *Sun* in an editorial, which said:

The B. C. Electric from the first assumed responsibility for making the streets safe during and after the change. The B. C. Electric went to a great deal of trouble and expense to inform and advise the public how to conduct themselves to obviate accident. Officers of the B. C. Electric have performed a real public service in their attitude on the change in the rule of the road.

Persistent articles

To change from the left to the right is a matter of memory and clear thinking, according to the trolley company. The Roth memory system undoubtedly gained many new students as a result of the company's advertising. The rabbit wearing the silk hat, famed to all students of the system, is an excellent guide post to the roadway. One ear—the right, of course—stands up outside the equally famous silk hat, and that ear the pedestrian, the automobilist, the car passenger, follows. Simple, once you know how!

In one issue of the *Buzzer* was quoted a letter from the East, where life has always run on the right track. The letter said:

Why not picture the change to yourself at every opportunity between now and then? Just see yourself boarding

the car at your usual spot, at the other corner. See yourself standing 45 ft. from the corner waiting. See yourself boarding that car carefully, after going straight from curb to car. See yourself looking both ways before crossing street. See yourself look before passing behind a street car.

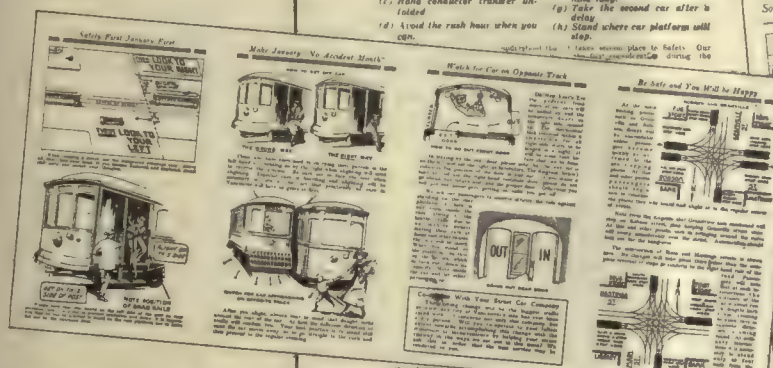
How You Can Help the Rule of the Road Change

WE urge the co-operation of everyone—pedestrian, automobile driver, vehicle owner and public generally—so that a minimum of inconvenience and disturbance to business will be suffered, and so that not a life may be lost in the traffic change.

1. Street Car Passengers

In order to prevent delay and loss of time to your service, please accustom yourself to the new conditions as quickly as possible—

- Have your exact fare ready.
- Buy trip tickets.
- Hand conductor transfer unfolded.
- Avoid the rush hour when you can.
- Let each passenger handle own fare.
- Passengers should board just behind lady.
- Take the second car after a delay.
- Stand where car platform will stop.



DRIVE SAFELY and you will KEEP RIGHT

Some suggestions to automobilists and drivers for avoiding accidents when the Rule of the Road changes

1. In approaching a street car, look out for the car and the car's passengers.
2. Look out for pedestrians stepping out from behind street cars.
3. When approaching a street car, look out for the car and the car's passengers.
4. Look out for the car and the car's passengers.
5. Give right of way to the car and the car's passengers.
6. Watch for the car and the car's passengers.
7. Avoid being stopped behind a street car.
8. Don't be "cut off" by a street car.

Business Depends Upon the Public Being Transported Safely and Quickly—Cooperate With Your Street Railway to Bring Car Service to the Usual Efficiency as Soon as Possible After the Change

SAFETY FIRST—SAFETY ALWAYS

BC Electric

POST THIS IN YOUR GARAGE

in the official publication of the company, the *Buzzer*, forewarned that on Jan. 1:

There will be the risk in crossing the streets. . . . Look both ways and cross only at crossings. There will be the risk to children playing, roller skating and coasting on the streets. They should be taught "Safety First." Risk will lurk in passing behind a street car. The new direction of traffic will make you forget, another car may come the way you never think of.

Getting on and off the car will need attention to safety, because few of the cars will have gates. Don't get on or off when cars are in motion. Use the left hand to grab the handle in getting off, and the right to carry parcels.

The concreteness of the suggestions for avoiding accidents is considered one of the reasons for the success of the campaign. Such advice as: "Signal from the curb for cars; Stand opposite the white marks at corners while waiting for a car; Never hesitate one moment after getting off a car, but go immediately to the corner; Don't cross in the middle of the block," showed simple acts which would save trouble, time and expense.

- Leave the platform from the car you have been used to.
- If you make a mistake, do not run in front of a train.
- At terminals do not alight until train stops.

5. General Information

For Passengers at Robson and Granville will make the turn onto Robson before step (a) Passengers all cars will be without gates for some time. Be watchful of approaching automobiles. Passengers are requested not to stand on the rear platform, as this congests traffic. It is necessary, last but not least, to minimize opening for getting on as they will delay on the New Vancouver car. Have all cars will be "Front Entrance Cars." Passengers will board and leave by the front end. This will cause all cars to make separate stops, and at various intervals.

New Vancouver passengers will board by the front "Move up to the Rear"

The B. C. Electric Railway Company hopes and trusts that this great change in traffic will be made as smoothly as possible and so that the operation will be the most successful in the history of the company.

SAFETY FIRST — SAFETY ALWAYS

B.C. ELECTRIC RAILWAY CO., LTD.

THE STORY AS TOLD BY THE BRITISH COLUMBIA ELECTRIC RAILWAY

For Safety's Sake

Do not board or alight until the car has stopped.

Automobile drivers should make out their license when coming to an intersection.

Don't take chances. It's best to double check.

Keep the children from passing on the street. They're playing or running in danger.

Keep your eyes about you at all times. Get used quickly to the new laws.

Look both ways.

Don't "step off" or "lean back" into the side of a car when you're waiting.

Vancouver residents heeded the warnings and did think, for since Jan. 1, when the street cars trundled out of the car-houses on the right instead of the left side of the street, and as the *Buzzer* said, horses long used to greeting their passing brothers with the right eye began to

use the left, there have been no serious accidents. Collisions have occurred between automobiles and trolleys, but no serious damage has been done.

One of the greatest problems connected with the change was in teaching children to be careful. The British Columbia Electric issued an eight-page booklet on "Safeguarding the Children," which contained ideas for essay topics, verses with lilting meter, impressing the necessity for watchfulness, and catchy safety slogans, such as "If your ball rolls into traffic let it go until traffic passes. You can get a new ball at any store, but you cannot get a new leg any place," and this one, "Methuselah was a careful man. He lived 969 years."

The children were also won to an animated interest in the change through an essay contest on Safety First. The sum of \$30 in prizes was awarded to the three best contestants.

To automobile drivers the company paid particular attention and issued a pamphlet which the government distributed. The diagrammatic illustrations of the manner in which accidents might happen and also might be avoided did much to force drivers to go slowly, to drive on streets minus trolley lines, to keep to the side of the road and avoid car tracks, and to park machines well away from car loading points.

Car cards played an important part in the informative propaganda, and these reiterated forcefully the rules the company was sending out in bulletins and pamphlets. The company was concerned with providing the same service during and after the change that prevailed under the left-hand rules. One card asked that, "as far as consistent with safety, help maintain the speed of the service by picking out your new corner, standing where car will stop, having exact fare ready, boarding at entrance and alighting at exit, passing right inside car when the Rule of the Road Changes." This warning was heeded.

A courteous request on one of the cars won the wished-for support during upset service. The card said simply, "If your car is delayed please remember that extraordinary conditions, more tie-ups, slower loading, heavier traffic, operate against our usual quality of service. We ask you to co-operate after a delay by taking the second car."

A final display advertisement was placed in the daily papers with simple rules, easy to bear in mind, for the trolley passenger, the pedestrian and the automobile driver. It informed the riding public at what points car service would be changed, and where and how to get the right car.

The plan of the company was to leave nothing to chance, and new interurban stations were clearly indicated, exits and entrances were definitely marked on city cars, with the result that the traveling public quickly adapted itself to the new rule, and now very generally "keeps to the right."

Directory Shows How to Get Where You Want to Go

"AN OLD-FASHIONED street car ride" to the interesting places in Toledo, Ohio, is the attraction which the Community Traction Company offers to the public in a compact directory of the railway's lines. The trolley company urges less speed on the way and more observation of the points along the route.

Safety Work Strictly Organized in Memphis

THE Memphis Street Railway, in a symposium, "Truth," published in the daily papers of Memphis elaborates to interested patrons how its safety committee does its work.

There is a central committee of twelve men which plans the work to be done. These plans are transmitted through captains and lieutenants of divisions to the workers covering the system. The active committee is composed of forty workers and five executives. Their work is to encourage the practice of safety rules and cultivate friendly good will with the public, to the end that accidents may be reduced and car miles per hour increased. Meetings of the active committee are held once a month, when reports are heard. A spirit of friendly competition exists among them in the efforts to show the most favorable report. A prize is awarded to the captain of the division having the best record for the previous month.

Don't Ride Your Auto to Work

Automobilists Have Futility of Using Their Own Machines Brought Forcibly to Their Attention by Railway at Tacoma

BY C. V. ALLEN

Publicity Manager Tacoma Railway & Power Company.
Tacoma, Wash.

RAILWAY owners, managers and operators point to the high cost of labor and materials, the inadequacy of fares and obnoxious or burdensome franchise obligations in seeking to explain the present financial condition of the electric railways. All of these are unquestionably drawbacks to the ability of companies to prosper, but there is another very serious contributory cause. This is the ever increasing competition of the privately owned automobile. In the industry the drain made upon gross earnings in this way is pretty well known, but practically no plan has been made to offset it, no effort made to sell the railway as against the automobile.

Today the business man who formerly used the trolley to go to his office and back now drives his machine, the woman who shopped by street car now drives her car to market, the picnic party that went by trolley now goes on rubber, the young people who were satisfied to go to a dancing party by street car now feel they must go by auto, the plumber who took the street car now drives to the job in a machine, the laborer very often drives to the factory in his own car.

In fact, the public is afflicted with "automobilitis" in a virulent form, but the majority have only a hazy idea of the high cost of such service as compared to electric railway fares.

Early in 1921 the company with which I am connected decided to work out an advertising campaign with the purpose in mind of selling electric railway service as against the automobile. All of the previous advertising of the company had been of the "display" type. The average individual considers the use of large display advertising expensive propaganda. He more or less resents it. But he knows the small "reader ad" is inexpensive. This is the kind of advertising the baker, the small grocer or the small merchant can afford, and it gets "under the consumer's skin" better.

Mainly for these reasons the company decided in favor of the "reader," the ad to be placed among the news items in such a way that the average newspaper reader would read half way through it before he would realize it was advertising. This of course necessitated enough human interest or human touch in each one to compel and hold attention.

The campaign was begun in February, 1921, with two small readers each day. The situation has been attacked from nearly all angles, but principally the advantage of the street car in economy, safety and convenience. The principal points played up have been the saving in mileage by the use of the trolley, the actual cost of running the car, the advantage of a bank account over the liability of a machine, the likelihood of theft of the car, the probable parking troubles, and the danger attendant upon driving on wet or slippery pavements. An idea of the variety of ways the question was handled is shown by the following quotations:

You can't operate that auto of yours as cheaply as the price of carfare. Take the street car.

How much time do you waste parking your auto downtown? Use the street car.

Your car costs you 50 cents to \$1 to go to your office

and back. The street car costs you 16 cents. Save that difference.

Add a couple of years life to your machine by riding to work or business on the street car.

The cost of one \$50 tire will pay your carfare to the office and return for one year. Take the street car.

There is more honest satisfaction in a good bank account than in owning an automobile. Take the street car and save money.

Read your morning paper on the way to your office. Save just that much of your office time. You can do it by taking the street car.

Here's a hunch—put your auto away for a few months and use the street car. With the money you will be able to save you can take a good automobile trip for your summer vacation.

* * * * *

Mr. Automobile Owner: Have you ever stopped to figure that picking up your friend on the way to your office adds materially to your operating expense? Take the street car.

Your car has just so many miles of life. Are you grinding its life out riding to work or office every day? Take the street car and save your machine for your pleasure trips.

Your wife would like the car to drive around in during the day. It would be mighty fine of you to go to your business on the street car and leave the machine at home for her.

The street car is the surest, safest and most economical form of conveyance. Take the street car and save money.

We know a fellow who mortgaged his home for \$1,800 to buy an automobile. That little mortgage is going to take out most of the joy in his having that car. Use the street car and save money.

False pride has bought many an automobile. Be honest with yourself. Use the street car and save your money.

You ought to carry liability, fire and theft insurance on your machine. The premium on that insurance would pay carfare for a family of five for six months. Take the street car and save money.

After the novelty of driving to your business in an automobile has worn off, why not take the street car to work and back and save that daily wear and tear on your machine?

Spend and the world spends with you. Save and your li'l old bank account stands by you when the goin' is tough. Don't spend all your spare income on that machine; take the street car to your business and cut down your automobile expense.

You young fellows between the ages of twenty-five and sixty who live in the close-in residence district and drive to your office—you'll be money in pocket and in better health if you'd walk down to the office and take the street car home at night.

The whole outdoors of this wonderful Northwest is yours if you own a motor car. Keep the machine for those pleasure trips, but use the street car for business.

* * * * *

"Keeping up with the Jones'" has pushed many a man into buying a machine. Be sensible—use the street car.

You lose most of the "kick" in driving on pleasure trips if you pound that car of yours down to the office or shop every day. Use the street car for business.

Good salmon fishing is reported at the Narrows. Take a Point Defiance car to the park, rent a boat at the pavilion and get some real sport.

Street car service is always "on tap" for your use. Why not take advantage of it, and keep your machine to go where the street railway cannot reach. It will save you money.

Wet, skiddy pavements are accident breeders. Leave the machine at home and use the street car.

Not including direct operating cost or interest on investment, the cheapest make of car costs you nearly \$1 a day just to own it. We'll try to show you: Depreciation at 20 per cent a year, \$180; insurance, \$60; taxes, \$25; license, \$10.25; new driver's license, \$1; garage rent, \$60; total, \$336.25, or nearly \$1 a day, and you haven't turned a wheel. Take the street car and save money.

Mrs. Shopper: Do you know that your purchases cost you 50 cents to \$1 extra when you use your machine to make them? Shop by street car in the morning and early afternoon and you can shop very comfortably and at much less cost.

If you had to drop 50 cents to \$1 in a fare box every time you drove your machine downtown and to work, we'd say you'd think twice before you did it. Save money by taking the street car.

* * * * *

You wouldn't wear evening clothes and a silk hat to spade your garden in. Save the wear and tear on that expensive

investment, your automobile, by using the electric railway.

We know a fellow who won't go to the corner grocery to buy a yeast cake without his machine. It's the unnecessary use of your automobile that makes it expensive. Save mileage and you save operating costs.

We admit that the automobile is superior in some ways to the street car, but for every day, safe, dependable and economical service between home and business, the street car has no peer.

Depreciation, that sinister and unseen expense, is eating into the value of your machine every minute. Your dollars invested in it slip noiselessly away day in and day out. Take the street car and put your money into some income-bearing investment.

We know a man fifty-four years old whose son and daughter persuaded him to put his \$800 savings into a machine. That was four years ago. They sold the machine this spring, paid up their repair bills and had \$185 left. That's all that remains of that man's \$800. Take the street car and save your money.

Smith and Jones both drive to their office every day. Smith thinks Jones can afford to do it and Jones thinks Smith can. Neither really can. Be honest with your pocket-book and use the street car.

Are you like the ostrich, sticking your head in the sand when it comes to figuring up what the machine is costing you every day you operate it? Take the street car. The wise man is using it to go to his office and back.

It costs you at least \$1 a day to run that car to the office and back. Is the difference in the service between the street car and your machine worth that surcharge?

* * * * *

The little touch of humor which it was attempted to inject in the advertising has resulted in the paragraphs being quite generally read and without question has materially aided in holding business for the railway and should help substantially in attracting new patrons.

While it is difficult to compute exactly what effect the campaign has had on the riding, the total business of the company has held up to the record of a year ago, although sales in practically every other line of business have fallen off very heavily. Additional proof is the direct evidence of people who have made statements to officers of the company that they had followed the suggestions made in the advertising. Taking into consideration the lower cost of the advertising and its effective appeal to the common sense of the public, the company considers this particular advertising the most effective it has ever done and regards the results as more apparent than those obtained from any other advertising which it has ever attempted.

Ohio Road Starts Advertising Campaign

TO COUNTERACT propaganda calling for a reduced fare which is being circulated in Springfield, Ohio, the Springfield Railway has started a newspaper advertising campaign in an effort to show that the present fare of seven cents is very reasonable. An advertisement believed to have had the greatest effect in this respect is one in which a comparison is made of the transportation facilities of thirty years ago with those of the present day. The advertisement showed the picture of one of the old horse cars and beneath it appeared a picture of the modern electric street car. The "ad" is three columns wide and one page in depth.

"Thirty years ago folks rode in mule-drawn street cars traveling at a speed of four miles an hour and cheerfully paid the 5-cent fare. Today they ride in commodious, sanitary, comfortably heated and lighted cars at a speed of from 15 to 20 miles an hour at an increase in fare of only 2 cents," says the advertisement. The "ad" is convincing with respect to the improved service now offered.

Power Plant Economics Discussed by Engineers in New York

At Largely Attended Joint Meeting of Local Sections of A.I.E.E. and A.S.M.E. Turbine Tests, Boiler-Room Practice, Power-Plant Auxiliaries and Related Topics Were Covered in Papers by Operating Engineers

THE power-plant operating men ran the joint meeting of the American Institute of Electrical Engineers, New York Section, and American Society of Mechanical Engineers, Metropolitan Section, held in the auditorium of the United Engineering Societies' Building in New York City, on Feb. 24. Part of the formal and informal discussion is of interest to electric railway engineers concerned with the power plant. This refers particularly to the report upon efficiency tests of a 60,000-kw. cross-compound triple-cylinder steam turbine, by H. B. Reynolds and W. F. Hovey of the Interborough Rapid Transit Company; the paper on boiler-room economics by I. E. Moulthrop and R. E. Dillon of the Edison Electric Illuminating Company of Boston, and the summary of methods of energy supply for station auxiliaries and their relative merits by H. C. Albrecht of the Philadelphia Electric Company.

ELECTRIC RAILWAY ENERGY PRODUCED ON 11 LB. OF STEAM PER KILOWATT-HOUR

The tests reported by Messrs. Reynolds and Hovey were completed recently upon the 60,000-kw. turbo-generator unit described in an article by W. S. Finlay, Jr., printed in the issue of the *ELECTRIC RAILWAY JOURNAL* for May 10, 1919, page 906. The unit consists of one high-pressure element and two low-pressure elements, each driving a separate generator.

The normal steam pressure at the throttle is 220 lb. absolute, with a superheat of 150 deg. Fahr., exhausting into a vacuum of 29 in. of mercury, referred to a 30-in. barometer at 51.1 deg. F. The speed of all three elements is 1,500 r.p.m.

The unit is provided with a number of automatic features which make it possible for any one of the three elements to go out of service and allow the remaining elements to remain on the line to take care of the load. It has not been possible to make full use of these automatic features up to the present time, due to the absence of a relief valve on the exhaust of the high pressure turbine.

Most of the tests covered in the present report were of three hours' duration. With the exception of a few special tests, the turbine was operated under normal conditions, in so far as the type of load was concerned. The load was controlled from the switchboard through the remote governor-control system provided for that purpose. This method of controlling the load subjected the turbine to the full swings of the railway load. Two series of tests were run, one with the com-

plete unit in service and the other with the high-pressure and one low-pressure turbine in service.

The accompanying sets of curves give the general results of the tests, with particular reference to the total steam consumption and water rates of the units, and the thermal and Rankine-cycle efficiencies.*

From the curves it will be seen that the lowest water rate obtained while the complete unit was operating under normal conditions, was 11 lb. per kilowatt-hour, while the highest Rankine and thermal efficiencies obtained were 76 per cent and 25.1 per cent respectively. With the high-pressure and one low-pressure turbine in service, the lowest water rate was 11.25 lb. per kilowatt-hour. It will be noted that the water rate of the unit when the high-pressure and one low-pressure turbines are in service is better than that for the complete unit at loads below 25,000 kw.

In the discussion of this report Francis Hodgkinson, mechanical engineer Westinghouse Electric & Manufacturing Company, a leading steam-turbine designer, said that these tests had been made with scrupulous care and the results obtained were undoubtedly correct. While the manufacturers would have liked to see a still lower water rate indicated by these tests, they had no reason to be dissatisfied.

PRESENT-DAY BOILER ROOM OPERATION

The subject of power-plant operation was continued by Messrs. Moulthrop and Dillon, who said that there is no part of a steam generating power plant where scientific methods can be better employed than in the boiler room.

As to the power plant in general, a modern station is operated with one oiler and one fireman for each unit of 30,000 kw. or larger. The output per man is twenty times as great as in early stations. Furthermore 2.55 lb of coal, or 37,000 B.t.u., was required in the old engine-driven plants to produce 1 kw.-hr.; now this is accomplished with 1.25 lb. of coal or 18,100 B.t.u.

Large-capacity boilers equipped with modern fuel-burning furnaces, such as are going into many plants today, have an efficiency of 80 to 85 per cent at the operating point of loading, a gain of 15 to 20 per cent over types installed ten years ago.

*The Rankine efficiency is that which would be secured if all of the energy represented by the difference in heat energy of the steam entering the turbine and that leaving the turbine were converted into useful work, the thermal efficiency being the ratio of the work done to the energy in the entering steam.

The Willans line shown with the water-rate curves is plotted between total steam consumption and load. It was actually the basis for calculating the water-rate curves. The original shows breaks corresponding to the opening of the by-pass valves.

Another factor is the improvement in maximum load that can be supplied by a given number of boilers. In a plant built in 1905, the ratio of maximum load to capacity of boilers was 1 kw. per 10 sq.ft. of boiler heating surface installed; today it is 8 kw.

The character of the daily load curve has an important bearing on operation. If the curve is flat and without peaks, it will pay to operate the boilers at as near the point of maximum efficiency as is consistent with good operation and labor conditions, and as the capacity of the plant will permit. If there are peaks in the load curve, however, the degree of forcing over these peaks and the amount of banking to provide for them will depend on various considerations.

For example, the question arises whether boilers should be forced over the peak or additional boilers should be banked for it. The duration of the peak enters into this question, and the type of equipment determines how long a given high rate of forcing can be maintained without difficulty in keeping the fires in condition. Much higher rates can be employed for short periods than for longer ones. Furthermore, the extent of high forcing and the periods used affect the maintenance costs, which mount rapidly with high rates and with the length of time these rates are used.

There is a point at which the loss due to the burning of extra fuel by forcing at a high rate over a peak is equivalent to the loss due to the alternate case of carrying additional boilers for this peak.

The boiler-room foreman is responsible for having a sufficient number of boilers lighted to take care of the daily peak and the proper number steaming to give best efficiency at all times. He authorizes the number of boilers to be brought into steaming or to be taken out to provide for the load.

Here the fireman's duty begins. With the knowledge of the load to be carried and the number of boilers to have steaming to carry this load, he determines by his instruments and his instructions how much coal he must burn in each furnace to produce the necessary steam. He adjusts his equipment and studies his measuring instruments to insure proper operation.

In the effort to secure high efficiency in the boiler room, due consideration must be given to co-ordination with other parts of the plant. It is the efficiency of the boiler room and turbine room in conjunction which tells the final story. Too often it is thought that the measure of efficiency is the loss to the ashpit and up the stack. This will not prove to be the case until this loss is weighed against the loss of heat to the circulating water in the condenser. Feed water can be heated throughout the greater part of the temperature range from either of these two sources of heat. However, by utilizing some of the heat that would otherwise go to

waste in the circulating water, the turbine room gets the credit rather than the boiler room, and provided this credit outbalances the loss in the boiler room, the transfer is justified.

The story of present-day boiler room operation would not be complete without a word about conditions under which the men have to work in the boiler room. In modern plants it is the established practice to spare no expense in making conditions safe and eliminating accident hazards, providing plenty of light everywhere around machinery and plenty of space, and keeping the stations clean. The additional

3. High maintenance cost of speed-reduction gearing generally used with steam-driven equipment.

4. High condensation losses and complications of auxiliary steam piping.

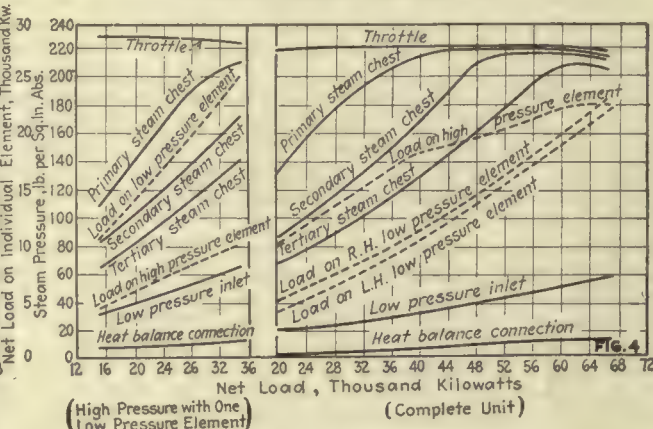
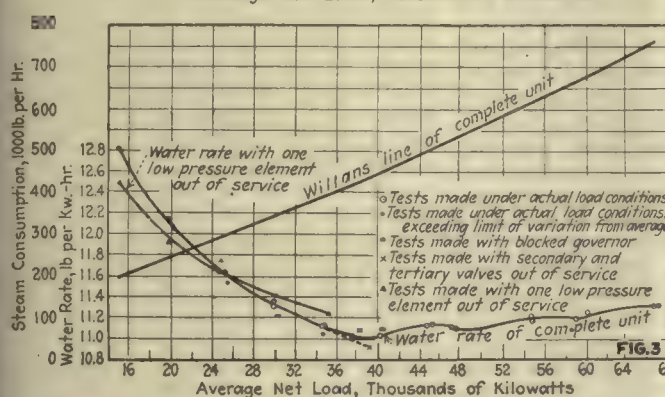
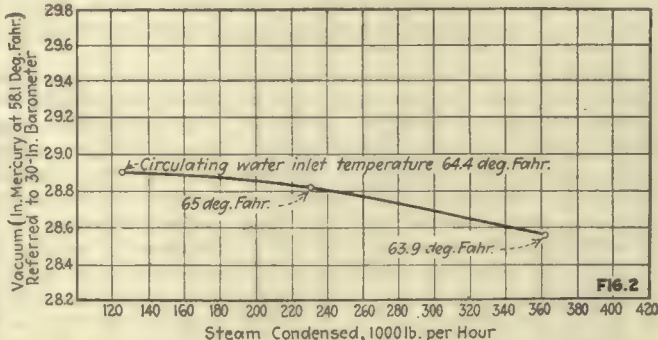
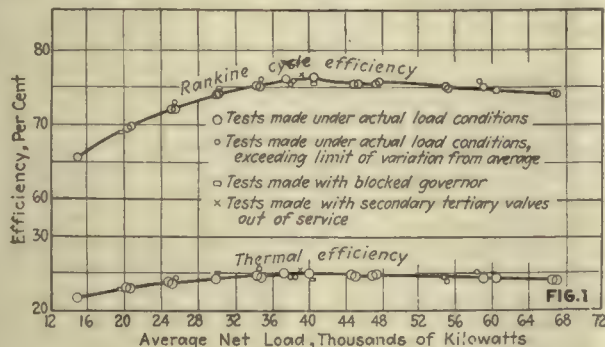
5. Further application of alternating current to auxiliary drive.

Energy for electric drive for auxiliaries may in general be supplied from: (a) The main generating unit or main bus, (b) a house turbo-generator, or (c) a combination of supply from main unit or main bus and house turbo-generator.

Any of the methods of supply mentioned may be arranged so that the supply will be from: (a) a common sys-

In the application of the alternating-current motor to auxiliary drive, one of the chief problems has been the development of satisfactory equipment for variable-speed service. The direct-current motor until recent years has been used to a great extent for this service, principally because of its very satisfactory inherent characteristics for such application.

In considering the extensive use of electric drive, it is necessary that the selection and layout of the equipment should be such as to give a high degree of reliability, because of the importance of the service. In case of trouble, de-



RESULTS OF TESTS ON 60,000-KW. TURBINE OF INTERBOROUGH RAPID TRANSIT COMPANY

Fig. 1. Efficiency of turbine expressed as ratio of mechanical output to thermal input, and as ratio of actual output to theoretical output.

Fig. 3. Water-rate curves.

Fig. 2. Relation of vacuum obtained in condenser to rate of steam condensation.

Fig. 4. Distribution of steam pressure throughout the turbine plotted against load.

expense that has been put into stations to improve conditions has given a high return on investment, and this factor alone has contributed in a great degree toward efficiency.

ELECTRIC DRIVE FOR STEAM GENERATING STATION AUXILIARY

In his paper on auxiliaries, Mr. Albrecht began by saying that in the past few years the use of electric drive for generating station auxiliaries in preference to steam drive has increased tremendously, particularly in modern plants. This change in practice has been brought about largely by the following factors:

1. Increased auxiliary power demands per kilowatt of generating capacity.

2. Wider latitude in selection of methods for obtaining heat balance under all conditions of varying load and seasons.

tem for all of the station auxiliaries, or (b) a segregated system arranged for operation of several selected groups of auxiliaries which may be so chosen as either to include a portion of the boiler auxiliaries and either all of the auxiliaries of an individual main turbine or pair of turbines, or only certain auxiliaries from two or more turbines. The former arrangement has the disadvantage that an interruption in the service may affect all of the auxiliaries supplied from the common bus, and the latter practice is of particular advantage when important motor driven auxiliaries are provided in duplicate.

Special precautions should be taken to include electrical equipment used in the supply and control of motors driving auxiliaries in boiler and turbine rooms, inasmuch as the operating personnel is probably not familiar with such equipment.

fective equipment must be immediately isolated with a minimum effect on other apparatus. It is of interest to record the use for the first time in large generating stations of truck-type switch-board equipment in connection with the 2,300-volt supply to station auxiliary motors in both the Hell Gate Station in New York and the South Meadow Station in Hartford. This type of auxiliary drive has such an important bearing upon the method of securing heat balance and consequently upon station economy and upon simplicity and ease of operation that there should be complete co-operation between mechanical and electrical design and operating engineers in its selection.

OTHER IDEAS AS TO AUXILIARIES

An interesting discussion followed the presentation of Mr. Albrecht's paper. R. H. Tabscott of the New York Edison

Company, pointed out that in large plants the auxiliary service substation may be as large as, or larger than, any substation on the system, and hence must be made just as reliable, if not more so. Mr. Hodgkinson expressed the belief that selection of auxiliary drive offers the greatest opportunity for economy. Reliability is no longer an advantage peculiar to steam-operated equipment, he declared, and necessity

for exhaust steam for feed-water heating is not so important with economizers. Even if feed water must be heated, that is no reason why uneconomical drive should be employed for auxiliaries.

He expressed a preference for house turbo-generator supply to auxiliaries, citing the advantages of the methods used by the Duquesne Light Company for obtaining a heat balance.

Conference on Crossing Specifications

Representatives of Railway, Railroad, Lighting, Power and Other Interests Met in New York and Agreed to a Program Which Will Bring About a Desired Harmony Among Conflicting Requirements

A LARGE and representative conference met in New York City on March 2 to consider the question of uniform specifications for crossing of overhead wires and to dispose, if possible, of certain differences of opinion in regard to Part 2 of the National Electrical Safety Code which deals with overhead lines. The conference was called by the American Engineering Standards Committee at the request of the American Electric Railway Association. The call for this meeting was explained in the issue of this paper for Feb. 25.

As a result of this conference the following resolution was adopted: Resolved, that it is the opinion of this conference that: (1) The remaining differences of opinion on Part 2 of the N.E.S. Code are small, and the different interests are approaching agreement, and that it is therefore advisable; (2) That the N.E.S. Code should be approved by the A.E.S.C. with the understanding that (3) there should immediately be organized a thoroughly representative sectional committee under the procedure of the A.E.S.C. to consider any revisions of Part 2 of the code which may be deemed necessary by any of the interested parties, and that (4) there should be a set of national specifications for crossings between overhead electric wire lines, because there is disagreement among existing specifications, and that (5) such specifications should be prepared by thoroughly representative sub-committees so as to make them in agreement with the code, with such revisions as may be made under the provisions of item 3 above.

In order to carry out the essentials of this resolution a conference committee representative of the groups, with Sidney Withington as chairman, was appointed to confer with Dr. P. G. Agnew of the American Engineering Standards Committee, to organize and decide on the various make-up of the sectional committee.

DISCUSSION WHICH LED UP TO THE RESOLUTIONS

In opening the discussion, M. B. Rosevear, superintendent of distribution Public Service Railway, Newark, N. J., presented, for the American Electric

Railway Association, a statement outlining the considerations which had led the association to request the conference and stating in general terms its position on the various items of the proposed agenda. This was followed by a brief statement by W. A. Durgin in regard to the general work of the Department of Commerce in promoting simplification in industry and industrial standardization along national lines. Dr. M. G. Lloyd, on behalf of the Bureau of Standards, then briefly outlined the development of the National Electrical Safety Code and its present position before regulatory bodies and utility companies and associations.

John Murphy, electrical engineer Board of Railway Commissioners, Ottawa, Canada, representing his commission and the Canadian Engineering Standards Association, outlined the status of crossing specifications in Canada. There the Board of Railway Commissioners has general jurisdiction over wire lines crossing or passing near railway right of way, and also over other wire crossings in case either one of the companies concerned is operating under a Dominion charter. The rules which have been followed by the board are simple. They work out so satisfactorily from the viewpoint of the railways, telephone, telegraph and electric light companies, that the Board of Railway Commissioners does not hear from one per cent of the cases which arise. The great feature is that the parties concerned must of necessity get together and co-operate before the work is done.

Discussing crossings generally, A. E. Davison, of the Hydro Electric Power Commission of Ontario, said that the commission has some 1,500 crossing and allied agreements, the majority of which come under the jurisdiction of the Board of Railway Commissioners. These crossings, wherever carried out in accordance with the sense and intent of the regulations, have operated without failure. Inasmuch as some of these crossings are twelve years old or more, special attention must shortly be given to inspection for maintenance. Since there is developing in Canada a tendency to criticize the above rules with the idea of strengthening the structures and wires crossing over supply conductors, the commission was pleased to

have the opportunity of co-operating the work of the present conference.

More than fifty delegates were present at the conference, all the principal interests being strongly represented.

Those present were: For the American Institute of Electrical Engineers, Percy H. Thomas; for the American Electric Railway Association, M. B. Rosevear, Charles R. Harte, R. W. Eaton and E. H. Scofield; for the American Railway Association, G. H. Dryden, Sidney Withington, J. H. Davis, E. B. Katté, J. C. Davidson, G. Eisenhauer, F. D. Hall, M. A. Baird, H. A. Shepard, L. C. Wells, I. C. Forshey and I. T. Seaver; for the American Telephone & Telegraph Company, K. L. Wilkinson and J. W. Hines; for the Bureau of Standards, Dr. M. G. Lloyd and H. H. Buell; for the Canadian Engineering Standards Committee, John Murphy; for the Electrical Manufacturers Council, Frederick Nicholas; for the Federal Power Commission, Charles E. Oakes; for the National Electric Light Association, Thomas Sproule, Paul Spencer, W. J. Canada, A. E. Silver, W. T. Morrison, J. C. Martin, and W. T. Oviatt; for the Postal Telegraph Cable Company, D. H. Gage; for the United States Independent Telephone Association, J. W. Morrison; for the Western Association of Electrical Inspectors, R. L. Daniel, F. A. Cambridge, J. T. Greene and W. S. Boyd; for the Western Union Telegraph Company, P. J. Howe, Douglas P. Dickie and C. P. Siedler; for the American Engineering Standards Committee, S. G. Rhodes; for the National Safety Council, F. W. Mitchell; for the Department of Commerce, W. A. Durgin and R. M. Hudson; for the United States Department of Labor, P. C. Menges; for various state commissions—Connecticut, A. E. Knowlton; Iowa, A. B. Campbell; Minnesota, D. F. Jurgensen; New York, C. R. Vanamen, W. C. Whiston and F. G. Daniell; Rhode Island, W. C. Bliss; Virginia, W. F. Rhea; Indiana, E. M. Blessing, and Hydro-Electric Power Commission of Ontario, A. E. Davison.

Executive and Subjects Committees to Meet

THE next meeting of the executive committee of the American Electric Railway Association will be held at association headquarters in New York on Friday, March 24, 10 a.m.

Chairman C. D. Emmons of the subject and meetings committee of the American Association has called a meeting of that committee for Friday afternoon, March 24, at association headquarters. The particular problem ahead of the subject and meetings committee now is the annual convention to be held in Chicago in October and the committee plans to get an early start on this work.

The committee will undoubtedly be most glad to receive suggestions from the membership as to subjects for the Chicago convention program.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Fare Reduction Unlikely

Head of Road at Springfield, Mass., Sees No Immediate Hope Ahead for Car Rider

In a statement following the announcement of the arbitration decision reducing wages and revising working conditions on the system, Clark V. Wood, president of the Springfield Street Railway, said that he could see no prospect that the 7-cent fare would be reduced before 1923. A reduction of the fare would be possible, he explained, only in the event of a pronounced increase of traffic or a further reduction of wages.

At present he can see no prospect of any marked traffic gain, and a further reduction of wages this year is barred by the agreement. He said that the wage as reduced by 10 cents an hour is still higher than the wage necessitating an increase of the fare from 5 to 7 cents in 1919. However, he said, in the event of a general industrial revival in the territory served by the company it is hoped that it may be enabled to take up the matter of a fare reduction earlier than can now be foreseen.

The statement called attention to the expenditure, estimated at more than \$350,000, which the company faces in connection with the new Connecticut River bridge, and the maturity April 1 next of \$1,700,000 of 4 per cent bonds. This would have to be met, it is stated, by either refunding or extension, entailing in either case a probable increase of the interest rate. In summing up, the statement says:

Under these circumstances the management feels that its first obligation to the public is to maintain and, so far as circumstances will permit, to improve its service to the public; that its second obligation is to place its securities on a basis where the investing public will purchase them, thus assuring a continuance of its ability to furnish adequate service, and that its third obligation is to furnish that service at the lowest possible rates consistent with the performance of its other two obligations.

Following the award of the arbitration board in its case, the Springfield (Mass.) Street Railway rearranged its schedules and placed 49 runs on the spare list. Extension of the spread of hours for spare men from 11 to 14 enabled the company to arrange the runs to better advantage with the result that about 75 men have been laid off. At the same time, all runs manned by regular crews were rebid. There is no curtailment of service. The reduction of regular crews involving the placing of 180 men on the spare list was carried out against the protest of the leaders of Springfield branch of the Amalgamated Association of Street & Electric Railway Employees. Complaint was made to the union's counsel, James H. Vahey, and it is stated that

he will take up the question with James J. Storrow, neutral arbitrator in the recent proceedings, alleging that the new arrangement is in violation of the terms of the award, in that the runs placed on the spare list should have been posted for rebidding. Under the recent award the spare men have a guarantee of seven hours work in fourteen, in place of nine in eleven, as before.

Chicago Matters Before Commission and Council

Seeking to show the reduced cost of living and of railway materials, the attorneys for the city of Chicago had several business men as witnesses before the Illinois Commerce Commission during the week ended March 4. There was also some discussion of wages in various industries, but none bearing on rates of pay for electric railway men. E. H. Morgan, superintendent of schedules for the surface lines, was also called as a witness by the city and admitted that the non-revenue hours paid for in the companies' time tables amount to about 19 per cent of the total. He stated, however, that most of this had been imposed by boards of arbitration following strikes.

Plans for consolidation of the surface and elevated lines have been discussed before the local transportation committee of the City Council and apparently will not be consummated in the near future. However, a number of engineers are drawing plans for a subway system. One plan was submitted by Alderman Cermak which calls for a six-track subway for freight as well as passengers, serving the whole city and costing about \$750,000,000. It is likely that a plan calling for the expenditure of the \$30,000,000 in the traction fund will be presented.

Puget Sound Company's Appeal Denied

The United States Supreme Court on March 6 denied the application of the Puget Sound Power & Light Company, Seattle, Wash., for review of a decision rendered against it by the United States District Court for Western Washington in proceedings brought against S. B. Asia, Daniel W. Bass and others. The power and light company, as the owner of \$15,000,000 municipal street railway bonds of Seattle, sought to set aside a decision obtained by Asia and his associates in a suit brought by them against the city to restrain, among other things, the application of the gross revenues of the municipal railway system to the payment of principal and interest on the bonds in preference to charges for maintenance and operation.

Sir Adam Raps Radial Report

Head of Power Commission Differs Violently With Sutherland Recommendations on Radials

Sir Adam Beck, chairman of the Hydro-Electric Power Commission of Ontario, has launched an attack upon the findings of the Sutherland Hydro Radial Commission. He calls into question not only the soundness of the judgment shown by the majority of that commission in its condemnation of radials, but directly reflects upon the fairness and motives of the commissioners themselves. While the Hydro-Electric Commission chairman issues a foreword with the statement, the document itself is essentially an engineers' report, which takes up, item by item, the findings of the Sutherland Commission.

In his foreword Sir Adam says:

I, for one, regard it (the majority report) as permeated by misunderstanding or by the misinterpretation of evidence, and by the omission of essential data, to an extent which nullifies its usefulness as a judicial document, and as a criterion by which either to approve or condemn the Hydro radial project.

The experts of the Hydro-Electric Power Commission still believe that the proposed Hydro radial system may successfully be carried forward along the lines originally recommended, and there has been nothing disclosed, either by the Sutherland Commission or through any other source, which has in any degree lessened their confidence in the radial project recommended—a project which can scarcely fail to be of very great social, commercial and financial benefit, not only to the municipalities directly concerned, but also to the Province, and, indeed, to the Dominion as a whole.

Sir Adam deals only with the Sutherland majority report. His criticism is prefaced by a brief review of the situation arising out of the adverse finding of the commission. The Sutherland report had unsettled the public mind as to whether radials could be constructed and operated as to be made self-sustaining and without producing a duplication of lines, and it was to clear up the situation that the reply had, at the request of the Hydro radial municipalities, been prepared.

Sir Adam trains his guns upon the qualifications of the experts upon whose advice the commission relied in preference to that of Bion J. Arnold, the expert engaged to make a report for the municipalities, and whose endorsement of the radial scheme was derided. Mr. Arnold, it is pointed out, was himself the owner and operator of an inter-urban electric railway, and recognized as one of the most eminent experts in his field. On the other side, the Sutherland Commission relied upon, first, three men who were steam railroad experts, W. F. Tye, George C. Martin and F. P. Gutelius, whose experience was not applicable to electric lines.

Sir Adam claims that C. E. Bailey and L. A. Herdt, two other "experts,"

whose judgment was accepted by the commission, and R. B. Rifenberck, who was retained as chief consulting expert, could not be classed as operating experts, and goes on to say that apart from some Canadian officials called to testify respecting conditions on certain local steam and electric lines, the only men called who might really be regarded as electric railway operators were F. W. Coen, R. M. Feustel and Robert I. Todd.

Of these Sir Adam's engineers claim that while their testimony would be of value if they were speaking of matters of which they had first-hand knowledge, their testimony upon the Hydro radial project was entitled to practically no weight "because of the almost total ignorance of these men with regard to the specific Hydro radials under discussion."

This "almost total ignorance" is shown by extracts from the evidence of the three experts.

The Hydro chairman closes his statement with a reiteration of the confidence in the whole radial scheme and an assertion of his belief that if the data presented had been rightly applied by the Sutherland Commission there would have resulted a clear and outstanding demonstration of the soundness of the estimates of the Hydro Commission's experts.

The report of the commission appointed to inquire into hydro-railway railways—known as the Sutherland commission—was issued in brief in August, 1921. It was not until last December that the report was printed in full and made available to the public. Just at that time Sir Adam says he was busy with the work incident to opening the Chippawa plant and with other matters so that detailed consideration of the Sutherland report was not possible. Moreover, it would not have been advisable to reply until the report was in the public's hands.

The real battle over the hydro-electrics seems only just about to begin. Speeches by Premier Drury indicate that the Government has under consideration the repealing of the existing Hydro-electric Radial Railway legislation, and the passing of legislation, in lieu thereof, which will authorize the construction and operation by the municipalities, or groups of municipalities, of such Radial Railways as the municipalities may approve under a commission, or commissions, appointed by the municipalities against this the municipalities are up in arms. They have adopted resolutions roundly scoring any such proposal and have forwarded them to the Premier and to each member of his cabinet. Among other things the point is made that, as the Hydro-electric Power Commission already manages the Windsor, Sandwich & Amherstburg Railway and the Guelph and Peterboro' street railways, and prospectively the York Radial and other lines for which rights-of-way are already purchased, "it would be suicidal to provide any other management for other and connecting electric railways."

Preparing for Detroit Election

On April 17 Voters There Will Decide Purchase of Detroit United Lines for \$19,850,000

At the special election to be held on April 17, at which the voters of Detroit, Mich., will decide as to the immediate taking over of the Detroit United Railway lines, a bond issue of \$3,500,000 will also be voted on to finance the down payment of \$2,770,000 agreed upon and to purchase certain material from the company as well as furnish working capital to start with.

UNPAID BALANCE A LIEN AGAINST RAILWAY

The terms of the proposed agreement provide that the city pay \$500,000 every six months until Dec. 31, 1931, when the balance remaining unpaid would come due, interest to be paid quarterly at the rate of 6 per cent a year. It was announced that with estimates based upon a 5-cent fare, the city expects to pay its annual payments and interest charges and own the system free and clear by 1931, paying for it out of earnings.

The City Council has adopted a resolution authorizing the City Clerk and City Election Commission to prepare for the special election on April 17, and directed the appropriation of \$87,525 to cover the costs of the special election and the registration required by law to be held prior to the election. The special election in the spring was favored by Mayor Couzens believing that if the fall election were waited for, the company would let its lines depreciate in the meantime and that the earnings during the summer would be lost.

The unpaid balance would not at any time be considered as a lien against the city, but would become a lien against the railway property.

It remains for the city to obtain a 60 per cent majority at the coming election in favor of the adoption of the purchase plan. If the plan is approved the two systems now in operation in the city will be consolidated under city ownership and operation.

NO INTERURBAN LINES INCLUDED

Louis A. Goslin, a Montreal director of the Detroit United, read to the stockholders the resolution providing that they approve the action of the board of directors in accepting the offer of the city of Detroit for the company's so-called city system of railway, including tracks, overhead equipment, cars, real estate, shops etc., with certain reservations agreed upon for the price of \$19,850,000. The resolution was seconded by J. C. Butterworth, another Montreal stockholder, who was a member of the committee appointed by the Detroit United Railway to confer with the city on terms of the sale. Mr. Butterworth was active in the controversy among Detroit United Railway stockholders at the annual stockholders'

meeting when control was won by the Canadian stockholders.

A resolution read by Avila Gingras, Montreal, was adopted providing for the adjournment of the stockholders' meeting, to meet again on March 10, for the purpose of considering the formal agreement to be entered into between the company and the city for the sale of the system. The resolution further instructed the secretary to send to each stockholder of the company a notice which shall contain the general terms of the proposed sale, and advising them that a formal agreement covering the terms of sale will be submitted to the stockholders at the adjourned meeting for ratification by them.

The city's payment plan, it is understood, was received with favor by the Canadian stockholders since the company will be enabled to meet its interest charges and make a considerable saving on the difference in interest rates between what the company pays on its bonds and mortgages, and the higher rate to be paid by the city.

It has been pointed out that if the city buys the Detroit United Railway's city system the private company will still have its interurban system, which is considered one of the finest and most strategically situated in the country and the city will have a total mileage of more than 350 miles of tracks, probably the largest municipally owned system in the world.

Central New England Road to Try Gasoline Coach

Plans are under way for a tryout of the new gasoline passenger coaches of the Central New England Railroad, Poughkeepsie, N. Y., to take place in Dutchess County some time this spring.

Announcement of this possibility was made by J. W. Cuineen of Danbury, general superintendent of the Central New England, in a talk before the Dutchess County Get-Together Association recently. Mr. Cuineen said:

"We are up against a proposition the railroads never met before. We have the competition of motor buses, jitneys and motor trucks. We have no quarrel with the motor truck. There is room for it, and for the railroads, but we feel that the commercialization of the highways should be paid for. The railroads pay taxes. The railroads feel that they are not used right in allowing this competition right alongside of them.

"So in order to reduce our costs we are experimenting with what they call the gasoline passenger coach. The New Haven road was the first to use it.

"I have one in my territory operating from Litchfield to Danbury, a distance of 40 miles. There is also one from Danbury to Waterbury, a 15-mile run. The coaches carry thirty-five people and have an average speed of 40 m.p.h. Probably future cars will have larger seating capacity. We want them to carry from sixty to seventy-five passengers."

Commission Wants Friendly Suits to Determine Rights of Bodies

The California State Railroad Commission in a letter, dated March 2, to the Los Angeles Board of Public Utilities expressed its willingness to terminate on March 7 the working agreement between the two boards entered into during the year 1916 for the joint and co-operative regulation of public utilities service in Los Angeles. The letter came as a result of the determination of J. P. Kennedy, the newly-appointed public utilities commissioner of Los Angeles, to test the jurisdictional matter between the two boards in the courts.

The letter outlines that the commission recognizes that the city of Los Angeles has jurisdiction in some cases, but declares that the commission's jurisdiction includes the regulation of all service matters that "are directly connected with or related to the fixing of rates," and also in cases where the public utility under consideration renders service extending to the public both within and outside of the city. The commission suggests friendly suits that "all questions of jurisdiction may be definitely and authoritatively determined by the courts."

The commission calls the attention to the fact that the working agreement between the city of Los Angeles and the State entered into in 1916 was based upon the belief by both State and city officials at that time that "it was more important that the commission and the city both devote their energies to securing the best possible service conditions than to quarrel about whose duty it was to do the job."

The letter states further the members have no apology to make for the existence of the working agreement between the city and the state boards, which the rail commissioners say, "has promoted the best interests of the citizens of Los Angeles, who are dependent for service." The state commissioners firmly point out in their letter that "in the future we shall exercise to the fullest extent such jurisdiction as we possess under the law to secure the most efficient service for the people of Los Angeles."

City of Montevideo Seizes Tramway Undertaking

An extraordinary situation affecting not merely British interests in Montevideo but also Uruguayan credit in the markets of the world is disclosed by Mr. Betterton's question in the House of Commons on Feb. 20 respecting the forcible seizure and disbursement of the funds of a British-owned tramway system by the Municipality of Montevideo.

It appears that at the beginning of the year the employees of the two Montevideo tramway systems struck for a large increase of wages. When the strike had lasted three weeks the municipality ordered the company to resume service and the men to return to work,

promising to give the latter their terms. The service was resumed at the end of January and since the company in question was unable to pay the wages demanded the municipality forcibly seized its funds and itself paid the men.

This arbitrary action is the climax of a somewhat critical situation dating back to 1918. Tram fares have not been increased all through the war, but in 1918, with a view partly to improving the welfare of the men and partly to meeting increasing costs, the company applied for permission to raise the fares. This was refused. In 1920 the application was renewed and under a promise that it would be granted a small increase of wages was given on account. The promise, however, never materialized. The company was thus involved in heavy losses, which were further increased by the passing of some extraordinary social laws which require the company to make payments and incur expenses not provided for in its concession.

Although the welfare of the workers is ostensibly the pretext for these high-handed proceedings, an attempt to establish municipal control is suspected.

Abundance of Railway Matter Before Legislature

Massachusetts has a long legislative programme this year affecting the electric railways. All the matters are still before the street railway committee of the Legislature, no action having been taken yet on any of them. However, a few hearings have been held.

One proposition before the 1922 Legislature is for the State to buy the bonds of the Boston Elevated Railway. Another plan calls for the removal of the surface structures which the Boston Elevated Railway maintains in Harvard Square, Cambridge, in connection with its subway service there. One bill seeks to change the existing law so that the Boston Elevated may be required to reduce fares before it has paid back to the communities any of the money which it advanced in the form of taxes to pay the deficit from operation. This company owes money to all the communities in which it operates and under the present law must pay it back before it can reduce its 10-cent fare.

Another proposition affecting the conduct of the Boston Elevated gives authority to this property to extend its service into the town of Revere, taking sections of the Eastern Massachusetts Street Railway by right of eminent domain if it cannot acquire such sections by agreement.

Other proposals include jitney regulatory measures, rules for the operation of one-man cars, establishment of transportation areas, and the establishment of an eight-hour day for all street railway employees. There are bills also which call for the abolition of the corporate franchise tax for the railways and a provision that they shall be taxed on their net income instead, and for

exempting street railways from assessment to pay for the public improvements in street and bridges when ordered by the authorities and not required as improvements to the railways.

Looking to Big Things—Mitten's Idea of Success

Service Talks, published by the Philadelphia (Pa.) Rapid Transit Company, has reprinted in its March 4 issue the high spots of President Mitten's address of Feb. 23 to the members of the General Committees. "The Will to Bigger Things" should have a stimulating effect upon all the employees of the company who have been told from time to time the value of co-operating with the management.

In expressing his appreciation to the men for standing by him in this period of stress Mr. Mitten told the history of his coming to Philadelphia. He carried his story down to the recent controversy "which has given to the public a much better idea of what we are doing, and has strengthened us in many ways. It has established direct contact between the management and the stockholders, through the agency of the men in their appeal for proxies. We now feel that we are working for men and women whom we know and who know us; people who have a genuine interest in our efforts to serve them, who appreciate what we have done in the past and our aims for the future."

In urging the support of the P. R. T. stockholders, Mr. Mitten said:

Think what it will mean to have these thousands of stockholders all actively pulling for P. R. T., constructively criticising when we fall short, and encouraging us when we do well! The influence of the brain and energy thus brought to our aid defies calculation.

This entire situation is quite without precedent. I know of no other organization where the community interest between employee, management and owner promises so much. In this respect as in others, we are breaking into ground entirely new.

We are going to do wonderful things, from now on, in showing what Men and Management, when unhampered, can do in getting results. Every man will do his utmost, not merely to help earn the co-operative wage dividend, but also to prove that co-operating labor, here in America, can beat the world.

Railway Business Improves When Competition Is Eliminated

Since the removal of bus competition in Muskegon, Mich., traffic on the lines of the Muskegon Traction & Lighting Company has increased and operating expenses are being met. This conclusion is arrived at after the submission of the January report on the first full month's operation since the elimination of competing bus lines.

In January 80,352 more passengers were carried than in December. Besides, the company paid its operating expenses realizing a net of \$2,863. The report states that its earnings were not sufficient to meet interest charges, etc. The first report submitted seems to be in accord with the predictions of company officials at the time the question of bus competition was before the commission.

All Positions Filled in Richmond

Strike There Is Over—Franchise and Other Matters Up for Consideration

The strike on the lines of the Virginia Railway & Power Company, Richmond, Va., is only technically on, the company having filled all positions and restored service on all lines. Advertisements for men have been withdrawn, and President Wheelwright states that the company now has a sufficient force and will not again return to domination by the Amalgamated Association.

Under government pressure the company at Richmond consented to the formation of the union during the war and the company regards the going back to a non-union basis as a distinct gain. On the other hand, the men in large numbers are running jitneys, several hundred autos in Richmond paralleling car lines and reaching to sections of the city not heretofore served with jitneys. This has caused a large falling off in the passenger receipts.

The city authorities in Richmond have done nothing to check the jitney, and will probably take no steps in regard to jitney regulation, the new general franchise, or the special franchise for trackless trolley lines until after the primary election for members of the City Council in April. Efforts of the company to secure from the Virginia Legislature a statute placing both jitneys and street cars under the State Corporation Commission as common carriers failed, under pressure of the localities seeking to retain home rule. A local bill passed allowing the city of Portsmouth to acquire and operate public utilities.

The strike never was serious in Petersburg and was settled amicably in Norfolk. There has been much feeling generated in Richmond and Portsmouth and in labor circles generally there is much opposition to any concessions being made to the company. At the same time that the City Council of Richmond was holding meetings to protest the wage cut of car men the new city budget was reported cutting the pay of city laborers to 38 cents an hour. This has met with little protest.

The power company has notified the city that it is not financially able to undertake its part of the paving program for this year in Richmond. The franchise requires the company to pave between its tracks and for 2 ft. on either side. The streets listed for paving this year would cost the company \$250,000 including track renewals and paving. The company asserts it is unable to borrow this sum under present conditions.

Schenectady Wage Dispute Resurrected

Officials of the union of railway employees of the Schenectady (N. Y.) Railway have asked members of the arbitration board on the wage question which considered the dispute between

the union and the railway last September to reconvene. They wish the board to decide if the previous award made by it was to have affected station masters, receivers and inspectors, and if the remainder of the award should not be paid.

Ouster Ordinance on Interurban Service Likely

Notice of the introduction of an ouster ordinance was given the City Council of Saginaw, Mich., on Feb. 28. If enacted the measure will call upon the Saginaw-Bay City Railway, now in the bankruptcy courts, and the receiver to remove all tracks and overhead construction from the streets of Saginaw. The action is in the nature of a showdown between the city on one side and the Saginaw-Bay City Railway and the Michigan Railroad, operating an interurban service between Saginaw and Flint, on the other, over the question of co-operating with the city in paving work, which members of the Council assert has been delayed several years because of the local company's poor financial condition. The dispute over this interurban service was referred to in the *ELECTRIC RAILWAY JOURNAL*, issue of Feb. 18.

North Shore Goes After Milwaukee-New York Traffic

Starting on Feb. 15 the Chicago, North Shore & Milwaukee Railroad put on two more fast daily trains between Milwaukee and Chicago to make connections with the "Twentieth Century" and "Broadway Limited," the two famous twenty-hour trains between New York and Chicago. This new train is called the "Eastern Limited." It leaves Milwaukee and Chicago at 9:55 a.m. and arrives at the opposite terminal at 12:10 p.m., stopping only at Racine and Kenosha, Wis. Twentieth Century passengers are received or unloaded at the La Salle Street station of the elevated, from which there is a direct entrance into the La Salle Street station of the New York Central Railroad. Baggage is carried on the same train and transferred at the same place. Broadway Limited passengers are received and unloaded at the Quincy Street station of the elevated and taxis are provided for carrying the passengers the few blocks intervening between the Pennsylvania Railroad Station and the Quincy Street elevated station. In this case baggage has to be forwarded one train ahead of the Eastern Limited in order to be put on the Broadway Limited. The North Shore Line makes reservations for Milwaukee people on the New York trains, which are held for them until the North Shore train arrives in Chicago. These trains already give promise of paying well.

As a preliminary to the starting of the connecting service Twentieth Century trainmen and porters and La Salle Street Station "Red Caps" were taken over the North Shore Line on a special train and entertained, so that they can answer any questions about this service.

Chamber of Commerce Rebukes Commission's Critics

Rebuking certain critics of the State Railroad Commission in a number of recent decisions which, it is charged, those affected have endeavored to have reversed through methods of "popular clamor and political pressure," directors of the Los Angeles Chamber of Commerce on Feb. 28 went on record to the effect that litigants "should be prepared to abide by the decision of authority, or employ the method of review and appeal provided by law." A resolution was adopted denouncing the alleged effort to change the commission's decisions through unlawful means and a copy was mailed to Governor Stephens at Sacramento.

10 Per Cent Wage Cut Proposed in Cleveland

Notice of a 10 per cent reduction in pay for all motormen and conductors, effective May 1, has just been posted by the Cleveland (Ohio) Railway.

Under the new scale of wages the Cleveland platform men will receive 50 cents an hour instead of 55 cents an hour for men in service of the company less than three months; 53 cents an hour instead of 55 cents an hour for men in the service of the company less than one year, and 55 cents an hour instead of 60 cents an hour for men in the service of the company more than one year.

Officials of the men's union announce that they will oppose the effort of the company to reduce the pay.

According to Paul E. Wilson, secretary of the Cleveland Railway, the proposed reduction will mean a saving to the company of about \$40,000 a month and insure a restoration of the 5-cent fare in Cleveland by mid-summer.

Negotiations between the union and the company over the proposed reduction in wages will probably be begun about April 1.

Increased Pay Sought on Jersey Line

The employees of the Trenton & Mercer County Traction Corporation, Trenton, N. J., sent a petition to the company asking for an increase in wages after April 1, when the new agreement goes into effect, but the company replied with the announcement that the men would be expected to accept a reduction in pay of 5 and 6 cents an hour. The present maximum scale is 50 cents an hour, with 5 cents an hour extra for the one-man car operators.

The men also want some of the working conditions changed and complain about the three-shift system. They want pay for the men who have to report for work in the early morning, but who fail to obtain runs for the day. The employees claim that the company promised them higher wages when it secured the 8-cent fare, but failed to live up to this promise.

Franchise Negotiations Renewed in Akron

In answer to a request made by the city for adequate service and extensions to the present lines, officials of the Northern Ohio Traction & Light Company, Akron, Ohio, at another conference expect to submit to the city a proposed fare for incorporation in the proposed flat rate franchise grant. The alternative in case the suggested fare is too high will then be to open negotiations looking to the service-at-cost franchise.

A. C. Blinn, vice-president of the company, announced that the fare in the flat fare grant would have to be sufficient to pay the operating expenses on the city system, provide for depreciation and taxes, and give the company a fair return on its investment. He asserted that the company, in a flat fare franchise, would have to make the fare high enough so that it would not suffer losses regardless of business conditions. The traction company, he said, can not speculate whether it is going to make or lose on the franchise, but must be sure that the rate allowed will pay expenses and earn a fair return on its investment.

Figures have been submitted recently by officials of the company showing that the cost of making seven rail extensions would amount to \$1,892,024. The cost of making six bus extensions, and rail extensions on Rider Avenue together with the double tracking of East Exchange Street would approximate \$500,000, according to the figures.

The company contemplates placing in service twenty-four motor buses on the extension lines specified by Council if a flat rate franchise is adopted. Three or four would be operated on all lines with the exception of the cross-town line by the way of Johnston Street it was said, on which line five buses would be operated.

New York State Men Prepare to Negotiate New Contract

Members of the local division of the Amalgamated at Rochester, N. Y., have voted to rescind their action in separating from the Utica and Syracuse divisions in the negotiations of an agreement to take the place of the existing contract with the New York State Railways. The agreement now in force expires on May 1. As a consequence of the action taken by the men, the Schenectady division will be included in the negotiations.

For several years the divisions in Rochester, Syracuse and Utica have conducted negotiations with the New York State Railways through a joint conference board, of which P. T. Noonan, Utica, is chairman. At the annual meeting of the Rochester division last December it was decided to conduct negotiations independently.

Syracuse and Utica invited the Schenectady division to join with them in the formation of a conference board and this invitation was accepted.

Through the offices of the international union the Rochester division was asked to reconsider its action. This it did.

A committee made up of the presidents and business agents of each of the four locals has been appointed to conduct negotiations. Either side must notify the other of changes it wishes to make on or before April 1. William McGinn is president of the Syracuse division and Owen Lynch is business agent.

Self-Propelled Car Replaces Trolley

Manhattan, Kan., a town of approximately 10,000 inhabitants, is now enjoying transportation service furnished by self-propelled vehicles operated over rails. Manhattan had electric railway service for many years, but when the local power company rated its "juice" too high to please

competes successfully with another transportation system. It connects with the Manhattan cars.

"Will they go through snow?" This was a question in the minds of Manhattan citizens when the new buses were installed. Snow didn't hinder them, as they successfully plowed through a 2-ft. layer of "traffic hinderer" without hesitation. In the new cars the load is equally distributed over the four wheels, which are all driving wheels.

The cars each have a seating capacity of thirty-two persons. They have high speed reverse gears which give as much speed in reverse as forward, locomotive type cow catchers and electric starting and lighting equipment. They are heated from the motor exhaust. The entrance and exit is near the front of the car with the door operated by the driver. The chassis



SELF-PROPELLED VEHICLE OPERATED ON RAILS

the interurban company, the railway decided to dispose of the electric cars and install a "fleet" of motor buses. The interurban company purchased six buses. In addition to serving the citizens of Manhattan, it has a track leading to Fort Riley and Junction City, and offers a service which is appreciated by patrons.

Manhattan is the home of the Kansas State Agricultural College, which means that first class service is required to please the large number of students who must make their classes on schedule. The accompanying illustration shows one of the buses on Poyntz Avenue, the town's principal thoroughfare.

The Manhattan City & Interurban Railway and its patrons are apparently well satisfied with the new service. The interurban cars are registering 300 miles a day, while the city cars average 190 miles a day. The new cars are said to be handling traffic at a cost of less than 15 cents per car mile.

Five gasoline railway cars have been purchased by the Interurban company. Four of these are used on the company's steel rails, while the other car has been equipped with 40 in. x 8 in. tires for use on the pavement between Manhattan and Fort Riley. This bus

of each bus weighs 7,200 lb. The attitude of the public toward the change has been expressed by a resident as follows:

The worn out electric equipment has been sold and junked. The new cars give first-class service. This is the secret of their popularity. The town looks better since the trolley wires and poles were removed. Only half as many men are required to operate the new buses as was the case with the old cars. Cost of maintaining the right-of-way has been reduced to small proportions because the new buses are light in weight.

Mining Papers Merged

The McGraw-Hill Company has purchased the *Mining and Scientific Press* of San Francisco and on April 1 will consolidate it with the *Engineering and Mining Journal* under the name of *Engineering and Mining Journal-Press*. These two publications are the leading magazines of the metal mining industry, the *Journal* having been established in 1866 and the *Press* in 1860.

J. E. Spurr, editor of the *Journal*, will be editor of the combined weekly, while T. A. Rickard, editor of the *Press*, will be contributing editor, keeping his residence in San Francisco and representing, in particular, the Coast and Western viewpoints.

The combined publication will be issued in New York.

Attack on Pennsylvania Commission Fails

Cases brought by the Borough of Edgewood, near Pittsburgh, to test the control of the Public Service Commission of Pennsylvania over electric railway companies, were in effect thrown out by the United States Supreme Court on March 6.

The suit was that of the Borough of Edgewood, vs. the Wilkesburg & East Pittsburgh Street Railway and the Public Service Commission. The Borough of Edgewood contended that boroughs and municipalities can regulate electric railway fares in Pennsylvania under contracts made by them with the companies. The Scranton Street Railway was allowed to file a brief in this case, but was denied the right to participate in the oral argument.

Interurban Wages to Be Arbitrated

S. D. Hutchins, Columbus, Ohio, and C. S. Rich, Springfield, Ohio, arbiters in the wage dispute between the Indianapolis, Columbus & Eastern Traction Company and its trainmen, will meet in Springfield soon to attempt to draw up a satisfactory wage scale. The arbiters met in Springfield on March 2 for a preliminary conference at which time they went over the matters at issue but without coming to any conclusion. They met again on March 8 and as a result a third member will be chosen.

The wage contract under which the trainmen had been working expired on Feb. 15. It provided a rate of 49 cents an hour. When the contract expired the company proposed that the rate be cut to 45 cents. This proposal, however, was rejected by the men who insisted on retention of the 49-cent rate. After several conferences had failed to bring about an agreement both sides decided to leave the matter to a board of arbitration, one member to be selected by the company and the other by the traction employees.

St. Petersburg Wants Municipal Power Plant

The city of St. Petersburg (Fla.), has rejected the proffered contract for electrical power to run the municipal railway submitted by the St. Petersburg Lighting Company to replace the contract expiring Jan. 1, 1923. The city is planning to build its own electrical plant to supply power for city purposes. Later it may be extended for public service, but according to Public Utilities Director R. E. Ludwig, the present plans are for a plant to furnish the city's power only.

Mr. Ludwig says that the proffered prices are too high and that the conditions of the proposed contract are "too onerous." He recommended that the contract offer be rejected and after a committee of the City Commission had investigated and returned its report,

Director Ludwig and the committee were authorized to tour the State and investigate all municipal plants as to initial cost, operating cost and other details. They are expected back and a decision will be made early in April. A petition containing the names of 2,000 citizens has been presented to the commission asking that a municipal plant be built if possible.

News Notes

Wants Electric Locomotives to Be Used.—Andrew P. Roman, assistant corporation counsel for the city of Buffalo has proposed a bill to be introduced at Albany, N. Y., compelling all railroads entering the city to use electric locomotives within the city.

Employees Notified of Probable Cut.—Wage reductions amounting to 20 per cent have been intimated in a bulletin issued to all employees of the Ottawa (Ont.) Electric Railway. It is said that the announcement will be made in April and that lower wages will become effective in May.

Denies Receivership Story.—According to a recent statement of L. M. Hobgood, president of the Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga., his company is not in the hands of a receiver. In fact in his opinion the railway is one of the most prosperous in the State of Georgia. Press messages of late have announced the appointment of a receiver for the property.

Seeks Relief From Paving Expenses.—Assemblyman Everett of St. Lawrence County recently introduced a bill in the New York Legislature advocated by street railway companies which will save electric railways several millions of dollars annually. The proposition seeks to relieve the electric railway lines from paying the cost of maintaining the streets between the tracks and for 2 ft. on either side. The cost would be met by the taxpayers according to the Everett measure.

Veterans Receive Annuities.—Annuities were granted to twelve veteran employees of the Georgia Railway & Power Company, Atlanta, Ga., as a result of the first meeting of the annuities board. The most conspicuous veteran in point of length of service was Roland G. Thomas who had a service record of forty years. The plan of the railway in caring for its disabled employees was reviewed in the ELECTRIC RAILWAY JOURNAL issue of Jan. 28.

Boston "L" Takes Men Back.—According to an announcement of the Boston Street Carmen's Union many blue uniform men of the Boston (Mass.) Elevated Railway have been placed back at their former positions during the past two weeks. At a previous meet-

ing of the union it was announced that more than 300 discharged employees had been taken back by the company. These men were among hundreds of employees laid off by the Boston Elevated in carrying out its economy plan.

Columbia Men Strike.—Service on the lines of the Columbia Railway, Gas & Electric Company, Columbia, S. C., has been suspended since Feb. 15 when the men went on strike following, it is said, the discharge of several employees. The president of the union of motormen and conductors has announced that the men will operate the cars pending settlement of the differences by a board of arbitration. F. H. Knox, president of the railway stated on Feb. 25 that no such offer of arbitration had been submitted to railway officials.

Can't Oust Railway.—According to a recent decision of the State Supreme Court the Northern Ohio Traction & Light Company, Akron, Ohio, is not denied its franchise rights to operate between Canton and Massillon. Ousting the railway was demanded by District Attorney Ruff of Stark County because the company had failed to start the work of double-tracking this line and had failed to pay any instalments which had been agreed upon. An agreement was made in 1919 when the company sought a franchise for a double track agreeing to pay \$75,000 in three instalments.

Franchise Draft Waits on Information.—The matter of formulating a new franchise under which the Menominee Light & Traction Company, Menominee, Mich., will operate is being retarded. So reports the franchise committee appointed by the Mayor. The committee alleges that the traction company has not submitted the necessary information regarding expenses, earnings, investments, etc. The committee asks for further time to act and then to prepare a franchise draft from other available sources which if accepted by the traction company will be submitted to the voters at the spring election.

Wants Railway Service.—Following threats of the Indianapolis, Columbus and Eastern traction service to withdraw service on the branch line to London, Ohio, because the branch was being operated at a loss, petitions are being circulated in the town proposing a referendum on the question of granting the company an increase in rates sufficient to make up the deficit. When the matter was brought before the London Council some weeks ago, the company's request for an increase in rates was met with a flat refusal. An ultimatum was then issued by the company that unless the increase was granted in the near future, service on the line would be stopped and the tracks junked. Evidently the action of the council was not approved by the citizens generally for the referendum petitions are meeting with favor and it is anticipated that the increase will be granted.

Financial and Corporate

New York Valuation Hearings March 20

The session of the New York Transit Commission several weeks ago at which the report of the bureau of valuations was received was adjourned until March 6 so as to permit the local railroads to examine the report and its recommendations and to present their views on the matter. On March 6 the companies sought an adjournment and the hearing was put over until March 20. The valuation figures were summarized in the *ELECTRIC RAILWAY JOURNAL* for Feb. 25, page 333.

Counsel for the commission said on March 6 that considering the magnitude of the matter and the great detail in the valuation report four weeks was not an unreasonable time for the companies to have to study the report. In this the members of the commission acquiesced. Chairman McAneny said, however, that the necessity did exist of putting the commission as soon as possible in a position where it could proceed with the finalities of its plan. Judge Shearn for the commission then explained that it was his idea that all the companies ought to be ready to proceed on March 20 in the matter of any objections that go to principles that have been applied in the valuations, and that as soon as these objections—if there are any—have been disposed of the commission should proceed as it directed at the outset to take up the detailed objections of the Brooklyn Rapid Transit System and then follow down through the others in the order in which they appear in the appraisal.

After the matter had been settled of putting over further consideration of the valuation matter the commission proceeded to consider the general question of the character of service rendered by the different roads. Some of the questions thus considered are reviewed elsewhere in this issue of the *ELECTRIC RAILWAY JOURNAL*.

Consolidation Prospects Bright in Spokane

The controversy between the city of Spokane, Wash., and the electric railroads there has reached a point where the consolidation of the two companies has been agreed to and negotiations started with the city looking to an arrangement that will eliminate jitney competition. The controversy dates back to last June. At that time the railroads secured authorization from the Public Service Commission to increase fares from 6 cents to 8 cents. The city retaliated by throwing the streets open to the jitneys.

With the high mark of daily traffic in the last several years running about 75,000 passengers, the jitneys, sixty-two of which operated last month, have taken nearly 30,000, leaving the street railways perhaps 40,000 to 45,000 passengers daily.

A plan of consolidation between the Washington Water Power lines and those of the Spokane & Eastern Railway & Power Company has been agreed upon between President D. L. Huntington of the Washington Water Power Company and M. H. McLean, Chicago, representing the bondholders of the latter company. The plan is to have a third company, the Spokane City Transportation Company, take over both city railway properties and do away with all parallel lines in the city.

It has been proposed to the city that a new franchise be issued to this company on the basis of a 7-cent fare and a universal transfer. The proposed new franchise would permit the company to withdraw from the business at the end of ten years and also to use motor buses, trolley buses or any other modern method of transportation in lieu of electric street cars.

The matter has just been presented to the City Council and there is no intimation as to the outcome. One thing is agreed even by city officials, namely, that the jitneys and street cars cannot both exist.

Income Bond Interest Declared Payable

The directors of the Third Avenue Railway, New York, N. Y., have authorized payment on April 1, 1922, of 1½ per cent interest upon the 5 per cent adjustment bonds of the company. Interest on these bonds, which is payable semi-annually, has not been paid since June 30, 1917. President Huff said:

With the reduction in cost of labor and material surplus above paying interest on the underlying bonds has increased until, for the six months ended Dec. 31, 1921, full interest was earned upon the 5 per cent adjustment bonds. This was the first time for several years, however, that full interest had been earned for a six months' period and during the following month, January, 1922, full interest was not earned. Under these circumstances and in line with the conservatism that has always characterized the management of this property, the directors have deemed it inadvisable to pay more than 1½ per cent interest for the period ended Dec. 31, 1921.

First Dividend in Forty Years!

The dividend announcements of the London underground electric railways for 1921 were made early in February. In many cases they show marked improvement over those for 1920. The most remarkable point is that there is a dividend of 1 per cent on Metropolitan District Railway ordinary stock. That stock has received no dividend since the year 1882, and then the rate was only ½ per cent. Presumably the increased fares are the cause of returning prosperity. The City & South London Railway and the London Electric Railway ordinary stocks get 3½ per cent, or about double the dividends of a year ago. Central London Railway deferred gets 4 per cent, against nothing last year.

Profit Realized in Des Moines

For the first time in several years the Des Moines (Iowa) City Railway was able to show a profit during the month of January. According to the company's report filed with the city car supervisor traffic during the month resulted in a profit of \$18,616. The total of revenue passengers carried during the month was 2,716,045, an average of 87,613 a day. Total revenues from all sources were \$215,927. Against these receipts operating and depreciation charges amounted to \$148,574. Tax charges were \$15,000 and fixed charges amounted to \$33,737. This makes a total for expenses of \$197,311.

F. C. Chambers, general manager of the company, estimates that the Valley Junction bus competition cost the company \$2,400 in profits during the month. January is the first month since the adoption of the new franchise where street cars had an entire month without competition in Des Moines from the buses. During the month service was restored to the pre-war basis.

Mr. Chambers has made study of the January fare figures which produces some interesting results as to the various charges which eat up the fare paid by the passenger. On account of the number of city policemen, firemen and charity workers who ride the cars without paying it has been figured that the average passenger revenue is 7.6 cents. Of this amount labor charges take by far the greatest proportion, namely 3.15 cents. Other charges are interest 1.16 cents, material 0.88 cent, depreciation, 0.64 cent, surplus, 0.65 cent, fuel, 0.58 cent, taxes, 0.54 cent. The item figured as surplus is the "cushion fund" provided in the recently adopted franchise to enable a reduction in fare when \$150,000 has been created.

Indianapolis Dividend Deferred

The Indianapolis (Ind.) Street Railway has announced the passing of the regular quarterly dividend on the \$5,000,000 preferred stock, which forms the underlying security of the system as it was reorganized when the Indianapolis Traction & Terminal Company ceased to operate it.

The notice to the preferred stockholders was as follows:

After a careful examination of the company's present financial resources, the board of directors deem it advisable to defer the payment of the quarterly dividend due March 1, 1922.

The urgent necessity of an increase in revenue in order that the company may meet its obligations, including the dividends on the preferred stock, and make necessary improvements is again being presented to the public officials and it is hoped that the justice of the company's claim will be recognized so that the payment of dividends may be resumed as speedily as possible.

This notice to preferred stockholders discloses that in the presentation to city officials of data concerning the company recently the company officials emphasized the need for the city so to modify the terms under which the company operates that it may give service at a profit in the future.

Deferred Payment Plan Suggested in San Francisco

An amendment to the city charter will have to be voted by the people before the city of San Francisco, Cal., can purchase the entire rights and properties of the Market Street Railway. This is the opinion of City Attorney George Lull. Conferences are now being held looking toward the purchase. Mr. Lull is reported to have said:

The charter permits us to purchase outside the city for water rights, but not for street car rights. The line running from San Francisco to San Mateo city is a big money earner for the company and is included in all the estimates of the \$40,000,000 valuation made by City Engineer M. M. O'Shaughnessy. If the voters want to purchase the system, in my opinion, they will not wish to leave out the line that makes the most money.

Mr. Lull said the Market Street Rail-

road should be bought by as many people as possible.

Since the rehabilitation of the property the line is going well though not in the way of an investment. The present owner of the line has spent considerable money in putting tracks, wires and equipment in good condition so it was pointed out to the directors that it could be considered a sound business proposition.

E. W. Clark Reports Summarized

Reports of the corporations under the E. W. Clark management, Philadelphia, Pa., for the year ended Dec. 31, 1921, have been submitted. Among the companies reporting are the Commonwealth Power, Railway & Light Company System, Bangor Railway & Electric Company, Nashville Railway & Light Company

Outlook in Findlay Brighter

Edward Goepper, president of the Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, told the stockholders at the annual meeting that "the outlook is now much better for a gradual return to more normal conditions within a reasonable time."

He said that the company had held its own during the last year of depression without increasing its floating debt. He said further that an adverse factor that has seriously affected receipts of all interurban lines was the constantly increasing use of the automobile as a means of conveyance for both passengers and freight. Enactment of legislation placing such motor vehicles operating for profit under state regulations as are all the railways, was urged.

	Commonwealth Power, Railway & Light Company			Bangor Railway & Electric Company			Nashville Railway & Light Company		
	1921	1920	Increase Per Cent	1921	1920	Increase Per Cent	1921	1920	Increase Per Cent
Gross earnings.....	\$31,309,259	\$31,285,981	0.1	\$1,420,471	\$1,262,779	12.5	\$3,857,852	\$3,675,209	5.0
Operating expense and taxes...	20,865,452	22,390,298	6.8*	†877,213	800,777	9.5	†2,976,632	2,979,332	0.1*
Net earnings.....	\$10,443,807	\$8,895,683	17.4	\$543,258	\$462,002	17.6	\$881,220	\$695,877	26.6
Interest, etc.....	7,527,859	7,020,765	7.2	282,286	263,707	7.0	471,082	479,326	1.7*
Balance.....	\$2,915,948	\$1,874,918	55.5	\$260,972	\$198,295	31.6	\$410,138	\$216,551	89.4
Pfd. stock div.....	1,077,180	1,077,180	....	108,174	105,000	3.0	125,000	125,000	....
Balance.....	\$1,838,768	\$797,738	130.5	\$152,798	\$93,295	63.8	\$285,138	\$91,551	211.5
(Available for renewals, depreciation, financial requirements of companies and dividends on common stock.)				(Available for financial requirements of company and dividends on common stock.)			(Available for renewals, depreciation, financial requirements of company and dividends on common stock.)		
*Decrease.				†In December, 1921, \$29,291; December, 1920, \$8,905; twelve months, 1921, \$100,647; twelve months, 1920, \$66,742 included for depreciation.			*Decrease.		
Note: Dividends on preferred stock accumulated, but unpaid since Feb. 1, 1921.							†In December, 1921, \$20,754; December, 1920, \$3,000; twelve months, 1921, \$186,228; twelve months, 1920, \$36,000 included for depreciation.		
	East St. Louis & Suburban Company System			Portland (Ore.) Railway, Light & Power Company			Cumberland County (Me.) Power & Light Company		
	1921	1920	Increase Per Cent	1921	1920	Increase Per Cent	1921	1920	Increase Per Cent
Gross earnings.....	\$3,818,302	\$4,368,922	12.6*	\$9,922,242	\$9,564,615	3.7	\$3,305,110	\$3,114,008	6.1
Operating expenses and taxes..	2,977,429	3,322,699	10.4*	†6,992,326	6,676,157	4.7	†2,242,835	2,142,835	4.7
Net earnings.....	\$840,873	\$1,046,223	19.6*	\$2,929,916	\$2,888,458	1.4	\$1,062,275	\$971,173	9.4
Interest, etc.....	654,385	647,272	1.1	2,107,733	2,101,615	.3	697,876	667,483	4.6
Surplus.....	\$186,488	\$398,951	53.3*	\$822,183	\$786,843	4.5	\$364,399	\$303,690	20.0
(Available for financial requirements of companies and dividends.)				(Available for financial requirements of company and dividends.)			(Available for financial requirements of company and dividends.)		
*Decrease.				†In December, 1921 and 1920, \$59,782; twelve months, 1921, \$717,386; twelve months, 1920, \$642,002 included for depreciation.			†In December, 1921 and 1920, \$17,568; twelve months, 1921, \$215,220; twelve months, 1920, \$210,820 included for depreciation.		
†Included for depreciation, December, 1921, \$26,170; December, 1920, \$17,369; twelve months, 1921, \$330,919; twelve months, 1920, \$359,417.							Note: One year's back dividends on the preferred stock were paid in February, 1921. In May, 1921, regular quarterly dividends were resumed. There remain unpaid back dividends amounting to \$241,500.		

way offered a method of purchase at a conference on Feb. 27 on a split basis—that is, the city vote \$14,000,000 in municipal bonds and make the rest of the payments for the system out of the revenue of the line on the installment plan. The city bonds would be negotiated to take care of the \$14,000,000 bond issue made by the company, which becomes due in 1924.

Purchase of Railway Proposed

The directors of the Chamber of Commerce of Valdosta, Ga., have endorsed a plan whereby the residents and business interests of the city will buy the Valdosta Street Railway and operate it. It was suggested that a committee should be formed looking toward the organization of a holding company for the property and that stock

should be bought by as many people as possible.

The Commonwealth Power, Railway & Light Company, controlling properties in the central west, shows a balance of \$1,838,768 against \$797,738 a year ago. It is noted that in its report for 1920 this company showed a 40 per cent decrease in balance whereas in 1921 the increase amounted to more than 130 per cent.

The most appreciable increase in balance available for depreciation, renewals, etc., was shown in the report of the Nashville Railway & Light Company, where an increase of 200 per cent is seen in the balance. The statements of operations for the above mentioned properties are reproduced herewith.

In discussing the service-at-cost franchise put in effect on the city lines here last March, President Goepper said that despite deficits that had been experienced the company sees a possibility of the system finally proving a success.

Seeks to Equalize Revenues.—To equalize the revenues of the street railways in the District of Columbia, due to the fact that the present rate of fare yields a greater return to the Capital Traction Company than to the Washington Railway and Electric Company, the Senate committee on District of Columbia is considering a proposal of the Local Public Utilities Commission to tax revenues between 6 and 7 per cent at the rate of 50 per cent and in excess of 7 per cent at the rate of 75 per cent.

\$13,400,000 New Financing at Atlanta

Plans matured by the officers of the Georgia Railway & Power Company, Atlanta, Ga., over a period of a year past provide for the raising of \$13,400,000 to be applied as follows:

To pay the floating indebtedness mainly due to losses of the past four years, about.....	\$5,000,000
To complete (now about 50 per cent finished) the 80,000-hp. Tugaloo hydro-electric development, about	2,000,000
To increase to 22,500-hp. (50 per cent increase) the capacity of Morgan Falls water power development, about	400,000
To provide increased service and facilities for customers in the electric and gas departments and street car service, about ..	2,000,000
In addition to the above it is estimated that during the next five years the demand for power will require additional high-tension transmission lines, costing about	2,000,000
These plans provide also for the construction of Mathis-Tallulah, Seed and Burton developments on the Tallulah River, all between the present development and Burton storage reservoir, using stored water successively, costing approximately	2,000,000
Total new cash capital needed to complete the plan	\$13,400,000

Harry M. Atkinson, chairman of the board, explains as follows:

To carry out these plans, this \$13,400,000 will have to be borrowed in the money market and expended in making these developments in Georgia and for the use of the public.

One great benefit under this plan will be that the waters of the Tallulah River will be used successively five times, where they are now used only once.

These developments will put the company in position to continue furnishing Atlanta and north Georgia continuous, efficient, dependable water power service at reasonable rates and will contribute more to the development and upbuilding of this city and section than any other one thing that could possibly come to it.

These plans are not merely on paper, but the financing has actually been done, subject only to the earning power of the company proving sufficient under the established rules of the money market to enable the company to borrow this sum. As a first step the mortgage has been prepared and has been submitted to and approved by the Railroad Commission, and the money has been secured subject alone to the security proving satisfactory.

The established rule of the money market requires earning power of a company like this of twice the amount of its fixed charges and interest and under the present rates allowed to be charged by the company only \$4,000,000 of this needed total sum can be secured at this time.

\$11,513 Net Income in London, Canada

In its annual statement for 1921 the London (Ont.) Street Railway reports an increase in its gross earnings over 1920 of \$43,138 but with an increase in operating expenses of \$32,787. Wages which were included in operating expenses amounted to \$351,476, an increase of more than \$22,000 over the previous year. Net earnings from operation amounted to \$80,522. After deductions of fixed charges and depreciation the net income realized was \$11,513.

President Currie's report makes mention of the difficulty experienced in operating the railway "at the extremely

low rate of fare of seven regular tickets for a quarter, and nine limited tickets for a quarter, during certain hours of the day." He further admits the company's inability to finance the purchase of necessary new equipment.

Lafayette Road Sold for \$201,300

The street railway system at Lafayette, Ind., was offered for sale on March 1, by Charles Martindale, Indianapolis, master in chancery. The track and the carhouse were purchased by Julius Berlovitz for \$75,000. Mr. Berlovitz stated after the sale that if the proper co-operation is extended by the city and West Lafayette authorities the system in Lafayette will be continued and the property rehabilitated.

The South Street power station, owned by the Lafayette Service Corporation, was sold to the Northern Indiana Gas & Electric Company. Emmett Mulholland, representing that company, was the only bidder. The sale price was \$120,000.

The street railway, it is announced, will continue to operate for the next thirty days under the present receivership.

Mrs. John S. Morrison, secretary of the board of trustees of the Indiana State Soldiers' Home, purchased the Tecumseh Trail property for a state park in connection with the Soldiers' Home grounds. Her bid was \$6,310.

There were no bids on the company's property as a whole.

All sales were made by Mr. Martindale subject to the approval of Judge A. B. Anderson in the United States district court at Indianapolis. The sale was ordered on petition of the bondholders of the Lafayette Service Corporation, who applied in the federal court for a receiver and foreclosure of their mortgage.

Mr. Berlovitz stated that he hoped to form a company of Lafayette citizens to take over and operate the railway. The tentative plan is to eliminate a few short stretches of unproductive track, if it is deemed advisable. The city and West Lafayette authorities will be asked to give the company proper protection by elimination of competition from jitneys. If this is done, it was stated, the company will proceed at once to rehabilitate the lines with new cars, the tracks will be put in proper repair and the line up Main Street hill will be relaid and cars put in operation.

Judge Anderson did not order the property appraised, but fixed an order that the railway and the carhouse which were purchased by Mr. Berlovitz, could not be sold for less than \$65,000; the power plant purchased by the Northern Indiana Gas & Electric Company for \$120,000, to be sold for not less than \$95,000, and the Trail property, purchased by the trustees of the Soldiers' Home for \$6,310, to be sold for not less than \$6,000. The total amount realized from the property was \$201,300, while the total indebtedness against the property is \$225,000.

Pittsburgh Railways Nets \$162,989

The Pittsburgh (Pa.) Railways finished the year 1921 with a surplus of \$162,989, whereas in 1920 it showed a deficit of \$910,057. The year's operating figures are contained in the report of the receivers, filed with the United States Court.

Though the total of 311,863,881 passengers for 1921 is 11,255,479 below the number for 1920, the increased fare allowed the company to enlarge its operating revenue by \$218,709. Daily

	1921	1920
Operating revenue.....	\$21,541,312	\$21,322,503
Operating expenses and taxes.....	17,661,992	18,754,795
Operating income.....	\$3,879,319	\$2,567,707
Non-operating income....	190,631	172,292
Gross income.....	\$4,069,951	\$2,739,999
Fixed charges.....	3,720,463	3,424,498
Receivers' net income, Surplus.....	\$349,488	
Deficit.....		\$684,498
Less verdicts, settlements, pre-receivership damage claims.....	186,498	225,588
Net income, surplus.....	\$162,989	
Deficit.....		\$910,057

receipts, which in January were \$61,666, were only \$56,839 in December. This is a decrease of \$4,827 a day.

The company increased its car mileage from 37,586,235 miles in 1920 to 37,974,664, though passenger travel decreased.

Chief items in the expenditures, including \$90,000 receivership fees, were semi-monthly wages motormen and conductors and others, \$10,203,220.28; monthly salaries, \$694,389.82, and repairs to tracks and equipment \$313,131.92. The financial showing for 1921, compared with 1920, as disclosed in the report of the receivers, is shown in table above.

Application Made for Permission to Abandon Line

Application was filed on March 6 with the Ohio Public Utilities Commission by the Springfield & Washington Railway, operating between Springfield and South Charleston, Ohio, for authority to abandon service on the line. The application was set for hearing by the commission for April 14.

Notice that such application would be filed was given some time ago by Floyd Baker, one of the owners, who said that since the Springfield manufacturing and wholesale concerns had been using their own motor trucks for delivery to South Charleston, the line had been operating at a loss. A committee of citizens from South Charleston and Springfield are now attempting to form a company to take over the line.

The line was originally intended to extend from Springfield to Washington Courthouse, Ohio, but when the right-of-way had been extended to South Charleston, the company ran out of funds and the line was never extended any farther.

Receiver Appointed for Pennsylvania Property

On application of the First National Bank, Bangor, Pa., which alleges that the State Belt Transit Company, Pen Argyl, Pa., has an indebtedness of \$23,000, the Northampton County Court has appointed Oscar J. Mutchler receiver for the company. The transit company did not oppose the receivership. The court has also appointed George Rasely, Mount Bethel, and Henry A. Made, Pen Argyl, appraisers.

The State Belt Transit Company has been operating in the state regions since 1900 and maintains lines between Bangor, Pen Argyl, Wind Gap and Belfast. Joseph Hambleton, for many years president of the company, has been appointed manager by Receiver Mutchler. The latter has been authorized to carry on the business of the company and operate the line.

Cambridge Subway Deal Will Pay for Repair Shop

Proceeds of the sale of the Cambridge Subway will finance the big repair shop at Everett which is being planned by the Boston (Mass.) Elevated Railway. The Boston property received \$7,568,000 for the tube between Boston and Cambridge. Some \$4,500,000 of this sum has already been used to pay off maturing bonds, which it was not deemed expedient to attempt to refund under then prevailing bond market conditions. The road's treasury is, however, entitled to be reimbursed for this \$4,500,000 and when it is decided that a good time has arrived the railway will arrange this postponed refunding operation and in that way secure funds for this construction.

Financial News Notes

Reorganized Company Pays Dividend.

—The directors of the Market Street Railway, San Francisco, Cal., have declared a dividend of \$1.50 a share on the prior preference stock applicable to the quarter ending March 31, payable April 1, to stock of record March 15.

Bankers Offer Public Service Stock.

Bonbright & Company, New York, N. Y., are offering \$3,700,000 of 8 per cent cumulative preferred stock of the Public Service Corporation of New Jersey. The price per share is \$100 and accrued dividends. This is the same issue of which more than \$1,000,000 has been subscribed by the company's patrons.

More Collateral to Be Sold.—A notice has been issued to holders of securities pledged under collateral trust agreement of the Memphis (Tenn.) Street Railway dated Nov. 1, 1917, securing two-year 6 per cent collateral gold notes that the trustee will offer for sale

at public auction at New York on March 15 all securities pledged under the collateral trust agreement.

Earnings Better at Pine Bluff.—The Pine Bluff (Ark.) Company reports for the twelve months ended Jan. 31, last, gross earnings of \$788,512, contrasted with \$773,363 the preceding year and a surplus after preferred dividends of \$127,312, against \$93,498. In January the company's gross was \$66,957, compared with \$68,185 in the same month of 1921 and a surplus after preferred dividends of \$12,469, compared with \$11,768 last year.

\$865,000 Bonds Offered.—Harvey Fisk & Sons, Inc., New York, N. Y., and Cassatt & Company, Philadelphia, Pa., are offering \$865,000 of the Darby, Media & Chester Street Railway's first mortgage 4½ per cent Gold Bonds. This property is part of the Philadelphia Rapid Transit System, which has guaranteed the bonds as to principal and interest. The bonds are offered at 81½ and accrued interest to yield more than 6½ per cent. They are dated July 1, 1906 and are due July 1, 1936. The offering was quickly oversubscribed.

Presentation of Valuation Case Concluded by Company.—Coleman J. Joyce, counsel for the Philadelphia (Pa.) Rapid Transit Company, announced on March 1 at a valuation hearing before Public Service Commissioner Clement that his side in the valuation proceedings has finished the giving of direct testimony. Mr. Joyce said he had no more testimony to bring before the commission, but would submit some financial data having a bearing on the matter. Assistant City Solicitor Samuel Rosenbaum, representing the city in the proceedings, informed Commissioner Clement that his side desired a month's time in which to prepare a report to be submitted to the commission.

Reclassification of Stock Proposed.—A special meeting of the stockholders of the United Gas & Electric Company, New York, N. Y., a subsidiary of the United Gas & Electric Corporation, was called for March 6, to ratify action of the board of directors in reclassifying the present common stock. At present the company has 26,210 shares of common, par \$100, outstanding. It is proposed to change this into an equal number of shares having no par value. The 3,790 shares of common remaining unissued after the exchange the company will reserve for issuance at such prices as the directors may determine, subject to approval of at least two-thirds of the common stockholders.

Fewer Passengers in Richmond.—In response to a request from the street committee of the Council of Richmond, Va., President Thomas S. Wheelwright recently forwarded to that body a statement of the number of passengers transported over the lines of the Virginia Railway & Power Company in Richmond during the years 1920 and 1921, in which it was shown that there was a decrease in 1921 over the previous year of 3,774,831 passengers hauled in the city of Richmond alone. The figures

were: 1920, 46,611,097; 1921, 42,886,266. So far this year, the figures are far below those of the previous periods. This statement was filed for reference when the committee begins its work of framing a franchise.

Plea Made to Discontinue Local Service.—Informing the City Council of Bellefontaine, Ohio, that the city service maintained over the traction line in that city was a continually losing proposition, F. A. Healy, general manager of the Indianapolis, Columbus & Eastern Traction Company, has applied to the Council for permission to discontinue the service. The franchise under which the company operates, has eleven years to run. The company offered to stop all limited as well as local inter-urban cars at each street intersection if permitted to remove the local car. No definite action has yet been taken by the Council, but a canvass of the members indicates that the request will be opposed by a majority if it is brought up for a vote, the Councilman contending that the land along the right-of-way has been built up because the home owners expected continued city service.

Bonds Authorized to Provide for Improvements.—A bond issue of \$195,000 authorized by the Railroad & Public Utilities Commission for the Knoxville Railway & Light Company, Knoxville, Tenn., will be sold to create funds with which to finance the building of the new substation now in progress of erection at the power house on Sixth Avenue. This was announced by Col. C. H. Harvey, president of the company. The new substation will cost approximately \$220,000, although no exact figures can be arrived at until the work is complete. Col. Harvey explained that the charter of the company allows it to issue and sell bonds to the extent of 80 per cent of expenditures for improvements. The \$195,000 to be issued and sold will be 80 per cent of the amount that will have been expended when the present improvements are completed.

Authority Sought to Issue Refunding Bonds.—The Northern Ohio Traction & Light Company, Akron, Ohio, has asked the Ohio Public Utilities Commission for authority to issue and sell \$1,225,000 first lien and refunding mortgage 7 per cent gold bonds, proceeds to be used in payment of \$1,145,000 Canton-Akron Railway bonds due March 1, 1922. In requesting the 7 per cent rate, the company held that prevailing market conditions necessitated the paying of higher interest at this time on traction securities. An issue on \$1,145,000 of first and refunding mortgage 5 per cent gold bonds originally was authorized by the commission July 21, 1916, to pay for the acquisition and redemption of first mortgage bonds of the Canton-Akron Railway, which is part of Northern Ohio Traction & Light Company's system, and on May 6, 1919, the commission authorized an issue of \$80,000 in bonds, dated Aug. 1, 1916, to reimburse the company's treasury for capital expenditures.

Traffic and Transportation

Fares in Springfield

Bus Competition Removed in Ohio City, but Revenue Still a Problem—Pass Being Talked

Although agitation has been started for reduction in fares by the Springfield (Ohio) Railway, it is more than likely that the 7-cent rate will be continued for some time to come at least.

This is indicated by the monthly reports filed with the city manager, which continue to show a deficit with no relief in sight. The reports are filed with the city under the terms of an ordinance passed some months ago granting an increase in the fare from 5 to 7 cents with free transfers.

BUS INCREASE COMPANY'S FINANCIAL EMBARRASSMENT

According to the report for the month of January, filed March 1 with the city, the company sustained a loss of \$5,704. This sum does not include accrued dividends due on the company's preferred stock, amounting to \$2,500.

The report shows that 766,351 passengers were carried during the month. Gross income for the month was placed at \$49,837. Expenditures charged against this included: Operating expense, \$40,034; taxes, \$3,667; interest on defaulted debt and other fixed charges, \$1,639; monthly installment of street improvement assessments for 1922, \$199.

The critical financial situation faced by the company was rendered more acute last fall when bus lines were established along routes followed by the company's cars. As the buses began operating practically overnight, there was no regulatory ordinance to govern them. Complaint was voiced by the railway when the bus operators began running their machines just ahead of the street cars and picking up persons along the way who otherwise would have ridden on the cars. These were attracted to ride in the buses, first, because the bus arrived before the car, and, second, because the buses charged 15-cent fare whereas the railway fare was 7 cents. The railway charged that this was manifestly unfair competition.

ORDINANCE PROVISIONS MADE AGAINST BUSES

Continued demand for some action resulted in the adoption on Jan. 9, 1922, of a bus regulatory ordinance, passed as an emergency measure. Because the terms of the ordinance were so drastic, however, the buses were allowed a period of thirty days to comply with its provisions.

The most drastic provision in the ordinance was the one barring the buses from the routes followed by street cars. Another provision considered onerous by the bus operators was the one re-

quiring indemnity bonds to be furnished by the operators to cover legal damages assessed for possible accidents occurring to passengers or others as the result of the bus drivers' alleged negligence. It was specifically stated, however, that the amount of the bond was not to represent the limit of the operator's liability should the courts allow a larger award than the amount of the bond. These bonds ranged from \$1,000 for machines having a carrying capacity of not more than six persons to \$20,000 for machines whose seating capacity exceeded sixteen persons.

Annual license fees were also provided. These were \$10 for all machines whose seating capacity was fifteen or less, \$150 for each bus whose seating capacity was sixteen to twenty-five passengers and \$250 for all buses having a seating capacity exceeding twenty-five persons.

Other provisions included in the ordinance required buses to be operated on regular schedules, be subject to inspection without notice by city officials, requiring the display of route signs in a prominent place on the front and sides of the machines, prohibiting the carrying of an excess of more than 25 per cent of the rated seating capacity, forbidding the collection of fares while the bus is in operation, requiring tire chains and fire extinguishers to be carried, requiring them to stop on the far side of streets to take on and discharge passengers, requiring two exits, one to be at the rear of the machine, and specifying lighting systems.

BUS LINES QUIT

Few of the bus lines continued in business after the period of grace for the ordinance had expired. The operators at first decided to carry the battle into court to test the legality of the ordinance, but changed their minds, some of them removing their buses to other cities. In two cases, however, where bus service was continued, the owners made test trips over the prohibited routes. Their arrest followed and every preparation was made to carry the fight to the Supreme Court when it was discovered that there was a flaw in the original warrants which caused the cases to be thrown out of court. Since that time those bus operators which have continued service have made no effort to attack the terms of the ordinance.

This regulation of the buses helped the railway in doing away with unfair competition, but the deficit in the earnings of the railway still continues, with both city officials and company officers attempting to find a satisfactory solution. At the present moment the weekly "pass" system is being considered, but whether this will be adopted remains to be seen.

Decision From State Supreme Court Expected

The State Supreme Court is expected to reach a decision on March 15 in the controversy between the State of Louisiana and the City of New Orleans. In this contest the state disputes the authority of the city, through its Commission Council, to negotiate with the New Orleans Railway & Light Company on rates of fare, gas, electric light and other matters affecting the public utilities of the city. The case was argued at great length before the full court of nine judges, this being the first case in the history of the state to come before the court since its personnel was increased from seven to nine judges.

It is anticipated that the court in its forthcoming opinion will take up all phases of the car tangle and will once and for all, in a comprehensive decision, settle the matter of the 5-cent fare litigation.

The argument in the case was opened by the state's Attorney General Coco, who contended that the rate-making authority was vested in the Public Service Commission, under the Constitution of 1921, while City Attorney Kittredge and H. G. Dufour, representing the railways, maintained that the Legislative acts of 1912 granted the City of New Orleans the right to fix fares and other rates.

46,608,899 Pay Fares at Times Square Stations

The Times Square stations of the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company handled the most passengers during 1921 of any of the stations of the New York companies. Figures which the Transit Commission has compiled show that 46,608,899 persons paid fares at these two stations. Experts say that fully as many persons leave the trains as board them at these stations, which makes a total of 93,217,798 persons passing through the stations, or an average of 182,788 daily. The Interborough station at Times Square handled 1,413,188 more persons than did the station at Grand Central, while the Times Square station of the Brooklyn Rapid Transit handled 2,157,860 more persons than the Union Square station, its nearest competitor.

At Times Square in 1921, 30,400,905 passengers took Interborough trains, and 16,207,994 boarded cars of the Brooklyn company.

Increased Rates in Effect

The Toledo, Bowling Green & Southern Traction Company recently increased the rates of fare between Bowling Green and Toledo, Ohio. The new fare to Toledo is 50 cents one way and 90 cents round trip. This represents an increase of 10 cents one way and 14 cents round trip. The fare to Maumee has been increased 5 cents one way and 10 cents round trip.

Service Standards to Be Promulgated

New York Commission Developing Plans for Requiring Increased Service Based on the Improved Financial Ability of the Companies to Increase Facilities

The question of the adequacy of service furnished by the railways in New York City is now before the New York Transit Commission for consideration. The commission announced at the session several weeks ago at which the valuation figures were presented that it was prepared to go into the general question of the character of the service rendered. After postponing on March 6 further consideration of the valuation details it did proceed on that day to inquire into the adequacy of service.

CHAIRMAN MCANENY explained that the question of service was taken up for the double purpose of securing the entry and enforcement of orders improving service as rapidly as possible in view of the improved financial condition of the roads and also in order that the railways, at the time the commission is concluding its examination of the valuations, shall appreciate how the service in the future will affect their costs.

HIGH STANDARDS TO BE EXACTED

The chairman emphasized the point that the commission was not introducing this general subject at this time as a threat of any pressure to be brought against the companies while the commission was considering these matters. On the contrary, the improvement of the service of the roads is and has been a prime consideration from the beginning. Conditions were improving with the companies and the commission desired it understood that the highest standards of operating service were going to be exacted. Mr. McAneny said:

"While we are bent upon a reorganization of the system that will improve its physical condition and that will be susceptible of extension at the same time we are bent upon securing the best kinds of train and car service that the lines can give."

With that object in view two or three months ago the several bureaus of the commission were instructed to work in co-operation in perfecting their observations of actual traffic and of preparing a standard set of operating principles toward which the companies would be expected to move as rapidly as their means might permit.

MR. TURNER DESCRIBES OVERCROWDING

Mr. Shearn, counsel for the commission, called as the first witness Fred W. Lindars. He was questioned at considerable length with respect to the recent financial showing of the various companies. Mr. Lindars was followed as a witness by Daniel L. Turner. He said that in connection with the valuation work a large number of observations had been made on the various lines, subway, surface and elevated. While that work was carried on men under him had been co-operating with Mr. Turner in considering proper standards of service that might be put into operation if the city could have the benefit of the economies contemplated in the adjustment plan.

Observations and reports made by Mr. Turner were then introduced into the evidence. He was examined with respect to some of these so as to establish the method of procedure in compiling the report. Mr. Turner testified to an overload of 247 per cent in the subway at the peak of the rush-hour traffic and an overload of 2 per cent at the time of minimum traffic. In other words nearly 250 people were crowded into a car with a seating capacity of fifty. During the rush the variation of headway was from 1 minute and 40 seconds to 4 minutes. Traffic varied in the number of cars from 120 during a twenty-minute period to forty-four cars during a twenty minute period.

Mr. Turner said that there was no operating reason why the local service interval could not be maintained at the most at two minutes and thirty-seven seconds whereas it was maintained on a five-minute interval. The underlying motive at the bottom of the company's policy was to make a profit. On the other hand, the primary consideration of the passengers is to secure adequate and proper service.

A RUNNING FIGHT IN INTEREST OF PASSENGERS

Mr. Turner said it has been one continuous struggle to enforce proper service by the operating companies. Counsel for the commission thought that that body would be warranted in instituting service orders. Chairman McAneny said that the point had been reached where the commission would be justified in taking much stronger measures than have been possible in the immediate past; in the first place, toward getting back to interrupted standards and then in setting up standards for the future.

Mr. Turner stated for the record what in his view and that of his associates should be the principles that ought to control proper standards of service for the various transit lines under the plan that the commission proposes. These are summarized as follows:

1. That on rapid transit lines frequent train service must be the fundamental principle. This may mean that during the middle of the day the headway on the trunk lines must be reduced to two minutes, and possibly to even less under some conditions.
2. That the amount of service on rapid transit lines must be made to respond to the traffic demand by varying the number of cars in the trains, rather than by changing the headway between trains.
3. That the service provided over the trunk lines, or through the line controlling points, must be distributed over the branches

of the rapid transit lines in proportion to the traffic on such branches.

4. That during the rush hours, the express and local service in one or both directions, as the traffic requires, past the maximum load point during every twenty-minute period must be the maximum that the line capacity will permit, the headway between trains must be the shortest possible, and the number of cars in the trains the maximum possible.

5. That, during the non-rush hours, on the express and local trains, in one or both directions, as the traffic requires, seats for all passengers must be provided during every twenty-minute period past the maximum load point, the headway remaining as nearly constant as practicable at the specified minimum headway and the number of cars in the trains varying with the traffic.

6. That during the period immediately preceding the rush hours, as traffic increases, the service must be increased, on a seat per passenger basis, by adding cars to the trains and shortening the headway, until the maximum service is equalled. Similarly, at the end of the rush hour, the service must not be reduced by taking off cars too soon.

7. That, therefore, on the rapid transit lines, the adoption of the preceding principles means generally that on every day, during all hours of the day, rush hours, mid-day and night, either seats or the maximum service that the line capacity will permit must be provided during every twenty-minute period.

8. That on the surface lines, during the rush hours, the headway between cars must not exceed ten minutes and the minimum headway the line capacity will permit, depending upon the traffic and the overloading permitted.

9. That on the surface lines during the rush hours a certain amount of overloading, or excess of passengers over seats may be permitted during each twenty-minute period, past the maximum load point in one or both directions as the traffic may require, the permissible overload will be specified for each line, depending upon the characteristics of the traffic service and equipment on such line, and the limitation of track capacity. Except where track capacity is the limiting factor, such overloads must not exceed a 50 per cent excess of passengers over seats. If the headway between cars is ten minutes a seat per passenger, service must be provided. The permissible overloading may vary between these limits, as determined by the commission, depending upon the type of car and headway being operated.

10. That on the surface lines during the non-rush hours, in no case should the headway be greater than ten minutes in the middle of the day between the morning and night rush hours.

11. That also during the non-rush hours, on the surface lines, a sufficient number of cars should be operated to provide a seat for every passenger during every twenty-minute period in one or both directions, as the traffic may require, past the maximum load point.

12. That during the period immediately preceding the rush hours, as traffic increases, cars must be put into service on a seat per passenger basis, until the number of cars in operation equals that required for the rush hours.

13. That similarly, at the end of the rush hours, the number of cars shall not be reduced until the traffic has fallen to a point providing a seat for each passenger, after which the service may be stepped down in accordance with this standard.

14. That during all hours of the day the car movement must be speeded up to the maximum possible and regular headways must be maintained.

15. That, therefore, on the surface lines, the foregoing principles mean generally that during all hours of the day, rush hours, mid-day and night, either seats during every twenty-minute period, or a specified maximum service must be provided.

16. That short line and turnback service must be scheduled on the basis that the service beyond the point considered must be such that on any three consecutive cars there must be provided an average of a seat per passenger.

The standards thus developed are not, it was explained, to be based on the ability of the companies to meet them with their present equipment and facilities, but rather with the capacity that can be developed by the companies with the necessary betterments in construction, equipment and operating agencies worked out with the co-operation of the commission.

Fare Hearing Shows Boise Company Borrowed to Pay Interest

The Boise Valley Traction Company, Boise, Idaho, has paid interest on its outstanding bonds with money borrowed from the Idaho Power Company. This was disclosed at the hearing before the Public Utilities Commission concerning the application of the traction company for a 10-cent fare.

The city protested against a 10-cent fare grant by the Public Utilities Commission, and also requested that the traction company show in detail how it lost the \$54,572 in 1921 claimed in the petition.

The fact that the Idaho Power Company has aided in financing the traction company will have some bearing, it is thought, on its valuation proceeding now before the Public Utilities Commission. If working capital has included funds to finance another company, the commission will have to take this into consideration when it investigates the cost of obtaining the capital.

The Boise Valley Traction Company owns and operates the interurban lines, the South Boise line and the Eighteenth Street and Tenth Street belt lines. It is asking for increased fares on the South Boise line and the two belt lines.

Average revenue on the belt lines in 1921 was 4.91 cents a passenger and the average operating expense was 5.77 cents a passenger, the application states, or a deficit for each passenger of 0.86 cents. The company estimates that the increased rate will give it a revenue of \$50,526. If the increase is allowed the revenue on the South Boise line will be increased from \$16,637 in 1921 to \$20,957.

At the hearing it was brought out that the 1921 power bill for four cars on the loop lines of the company and one on the South Boise line in 1921 was more than \$18,000. City Attorney Lampert compared this statement with the power bill of \$13,000 for six cars operated by the Boise Street Car Company.

The company has done no publicity work for several years toward increasing its business on its lines, according to the commission. No information concerning the advantages in buying strip tickets or commercial tickets in large quantities has been circulated among the passengers for several years.

Arguments are to be heard by the commission before it can render a decision.

Authorizes Five-Cent Fare in Hamilton

The City Council of Hamilton, Ont., by a vote of eleven to nine has authorized the Hamilton Street Railway to charge a straight 5-cent fare. The order states that the higher fare can be put into effect at an early date, remain in force until the end of the year and thereafter at the pleasure of the succeeding councils.

The relationship between the city

and the traction company has been a strained one for some time now over the matter of fares. The electors had shown their disapproval of the 5-cent fare by a large majority on Jan. 2. The Mayor, however, urged the higher rate for the company stating that there was not another city in America, the size of Hamilton, where people could ride at a lower rate than 5 cents. The fare agitation in Hamilton has been referred to previously in the *ELECTRIC RAILWAY JOURNAL*.

First Week of Pass in Fort Wayne Satisfactory

At the close of the first week's sales of the new weekly passes in Fort Wayne, Ind., S. W. Greenland, general manager of the Indiana Service Corporation, reported that the reception given the innovation by the Fort Wayne public was very satisfactory. Nearly 3,100 passes were sold the first week and it is expected that this number will increase. A tendency developed during the first week for the possessors of passes simply to tell the conductor that they had passes and to try to get out of the trouble of exhibiting the passes. But the rule of making every pass owner, who wished to use his pass, show it, was rigidly enforced and it is felt that this little difficulty will be entirely done away with in a short time.

Mr. Greenland declares that it depends on how the public overcomes all little points of friction in connection with the use of the passes whether the system will be maintained. He declared that the plan had been put into effect with the thought of speeding up the service and that it must not be allowed to become a hindrance in operating the cars efficiently. Passes good for a week on all city cars of the Indiana Service Corporation are sold for \$1. They are interchangeable.

Transportation News Notes

Six-Cent Fare Allowed.—The Ohio Electric Railway, Springfield, Ohio, has received permission from the City Council of Newark, Ohio, to charge a 6-cent fare in that city for a period of one year.

May Try Trackless Trolley.—It is reported that the Grays Harbor Railway & Light Company, Aberdeen, Wash., may apply for franchises to outlying districts of the harbor cities in order to test the new trackless trolley system.

City Council Approves Five Cent Fare.—The City Council of Buffalo, N. Y., has indorsed a proposed amendment to the state law to limit electric railway fares in cities of the first and second class to 5 cents with free transfers.

Rerouting in Effect in Chicago.—Rerouting of cars of the Chicago Surface Lines in the downtown district of Chicago, Ill., under a plan proposed by John A. Beeler went into effect recently. For the most part the operation was satisfactory.

Reduced Fares in Effect.—Reduced fares of 16.2 per cent went into effect on all lines of the Connecticut Company on March 1. The tokens, three for 25 cents, have been on sale since Feb. 25 and there has been a liberal demand for them. The casual rides will still pay 10 cents unless they have tokens at the reduced figure. The tokens are obtainable at all central offices of the company and from car conductors. They may be obtained in large or small lots.

Approves of Increased Fares.—At a meeting of business men and prominent citizens of Springfield (Ore.) recently, unanimous approval of the proposed advance in the fares of the Springfield-Eugene electric line was given. T. L. Billingsley, superintendent of the company's electric railway lines, gave figures to show that the company is losing money under the present fare of 10 cents between Eugene and Springfield, and 5 cents on the city lines. It is proposed to advance the fares to 12 and 6 cents, respectively.

Five-Cent Fare Defeated.—During consideration by the Senate of the District of Columbia Appropriation bill, Senator Harrison of Mississippi sought the adoption of an amendment providing for a 5-cent street car fare, or six tickets for a quarter in the National Capital. Senator Jones, of Washington, also favored the amendment. A point of order against the amendment by Senator Phipps, Colorado, in charge of the bill was overruled by the presiding officer and the Senate then by a vote of 27 to 21 defeated the proposal.

Establishes Two Zones.—The Frankford, Tacony & Holmesburg Street Railway, Philadelphia, Pa., has been granted permission by the Public Service Commission to establish two zones and to charge an 8-cent fare in each zone. Tickets, good in either zone, will be sold in groups of eight for 50 cents. Monthly commutation books for \$4.50 will also be sold on all passenger cars, good for fifty-two trips between Linden Avenue and Bridge Street. The first zone extends from the county line to Decatur Street and Frankford Avenue. The second extends from Frankford Avenue and Bridge Street north on Frankford Avenue to Blakiston Street, east on Rhawn Street from Frankford Avenue to the company's carhouse at State Road and Robbins Street and east on Bridge Street from the corner of Franklin Avenue to the company's carhouse. The company has two routes, one of which is leased from the Philadelphia Rapid Transit Company and is the connecting railway line between the Philadelphia Rapid Transit lines on the south of the city and the Trenton & Bristol Street Railway on the north.

Personal Mention

E. J. Murphy Made Statistician

Association Recognizes Service to the Industry of Its Acting Statistician by Promoting Him

E. J. Murphy has been appointed chief statistician of the American Electric Railway Association. Since the changes effected as a result of the reorganization at association headquarters last year, Mr. Murphy has virtually been carrying on the duties as indicated by the above title. He has been in charge of the preparation of the special monthly reports and compilations prepared by the Bureau of Information and Service, the editing of the proceedings and advance reports of committees and the publication of the *Engineering Manual*.

Mr. Murphy was graduated from the



E. J. MURPHY

College of the City of New York in 1915 with the degree of Bachelor of Science. Subsequently he took several courses in statistical methods and the general theory of accounting at Columbia University. After a short experience as a rater in compensation insurance he came to the association in 1916 as an assistant statistician. Except for a period of military service in 1918, he has been with the association ever since.

Since the appointment of Mr. Welsh as executive secretary Mr. Murphy has taken a large part in the handling of the affairs of the Engineering Association and acted as secretary at its meetings during the last convention. His special field, however, has been general statistical work, and he has been a regular contributor to *Aera* on the subject of electric railway conditions as revealed by statistical data received at association headquarters.

With the appointment of G. C. Hecker as special engineer, as reported in these columns last week, it will be possible to expand the work heretofore carried

on at association headquarters and Mr. Murphy will be able to devote his time in a greater degree to financial matters and to the general statistical work of the association, thereby enlarging this branch of the association's service.

F. L. Butler Given New Duties

Frank L. Butler, for the past year manager of the railway department of the Georgia Railway & Power Company, Atlanta, Ga., has been appointed general operating superintendent in charge of the railway, gas, electric and steam heating departments. He will also have charge of all matters pertaining to public service. Mr. Butler is also vice-president and a member of the board of directors of the Atlanta Northern Railway. He succeeds W. H. Glenn, who resigned as operating manager several months ago. He is recognized as an able executive in the gas and electrical industry, and as manager of the railway department for the company he has superintended the extensive improvements that have been carried out the past year. Mr. Butler, before assuming his position as manager of the Atlanta company, was manager of the Winnipeg (Man.) Electric Railway. He has also served with the Chicago & West Towns Railway and the Suburban Railway, Chicago, and the Alton, Jacksonville & Peoria Railroad.

J. R. Marsh Enters Utility Publicity

John R. Marsh, for the past two years on the editorial staff of the *Atlanta Georgian*, has been appointed assistant manager of the public relations department of the Georgia Railway & Power Company, Atlanta. Mr. Marsh has an exceptional record as a newspaper man in Atlanta. He has been connected with the *Lexington Leader* and *Lexington Herald*, and is a graduate of the University of Kentucky. He succeeds Paul Warwick, who is now with the Georgia Committee of Public Utility Information as executive secretary.

W. B. Spencer, who has been in charge of the transportation department of the Rhode Island Company, Providence, was recently appointed assistant to the president. He will be in charge of public relations.

John J. Treacy, president of the New Jersey Board of Public Utility Commissioners, has tendered his resignation for the second time since he was appointed a year ago. He wishes to resume private law practice in Jersey City.

Fielder Sanders, Street Railroad Commissioner of Cleveland from 1916 to 1921, resumed the practice of law in Cleveland on Feb. 15, with offices in the Hanna Building. Mr. Sanders

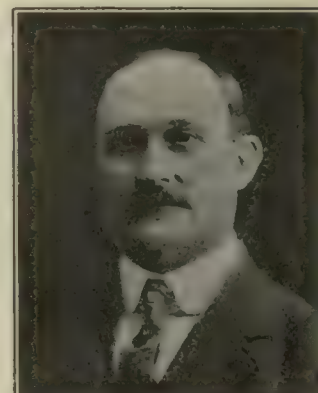
was judge of the Municipal Court from 1912 to 1915. A review of his work, particularly that in the utility field, was published in the *ELECTRIC RAILWAY JOURNAL* for Jan. 7, page 60.

W. P. Bailey Retires

After Many Years as Traffic Manager He Leaves Olean, Bradford & Salamanca Railway

After thirty-three years of almost continuous service in the railway field, W. P. Bailey, traffic manager of the Olean, Bradford & Salamanca Railway, Olean, N. Y., retired from his work on March 1. He will enter business with Floyd L. Kelly, Olean. Mr. Bailey's health necessitated his giving up his very trying work.

Mr. Bailey's railway experience centered in the middle Western territory from 1903 to 1910. During this time he held various positions with the Indianapolis & Northwestern Traction and the many consolidations which form the Terre Haute, Indianapolis & Eastern Traction Company. He made for himself a prominent name among officials



W. P. BAILEY

in the electric railway industry throughout the central part of the United States, and when in 1910 he transferred his activities to the Eastern coast as general freight and passenger agent for the Western New York & Pennsylvania Traction Company, Olean, N. Y., he extended his reputation in this new district. In a year's time he proved his capacity for excellent and seemingly unlimited work and was made general freight and passenger agent, with management of the parks operated by the company. His greatest single contribution to the company might perhaps be said to be the building up of the freight revenue. This department he recognized was a source of income insufficiently developed. He therefore devoted his attention to realizing from it all its possibilities. After an illness of a year he returned to his work in this department until the reorganization and taking over of the property of the Olean, Bradford & Salamanca Railway. He was then appointed traffic manager of the newly organized company, the position he has since held.

Charles R. Bohannon, for many years district purchasing agent and commercial manager for Southern Indiana of the Interstate Public Service Company, Indianapolis, Ind., is now manager of the lines at Jeffersonville. He succeeds Albert Keller, who now is associated with the American Public Service Company, Chicago, Ill.

J. F. Heyward, formerly general manager of the Cincinnati Traction Company, Cincinnati, Ohio, now retired and a resident of Tampa, Fla., has offered his services to the Quarter Million Club just organized and has been assigned to head the industrial bureau. This bureau has charge of investigating the financial stability of industries applying for the club's assistance and also the ability of such industries to be successful in Tampa. Mr. Heyward was formerly prominent in industrial, financial and engineering circles in the Middle West and East.

R. D. Williams has been appointed traffic manager of the Sacramento (Cal.) Northern Railroad. He will have supervision of both the freight and passenger service. Mr. Williams has a record of twenty-three years with the Erie Railroad traffic department in various parts of the United States. During the war he was furloughed to the government to organize and manage a traffic department for the housing division of the Emergency Fleet Corporation. After the war he acted as traffic manager for the California Fruit Exchange at Sacramento.

Obituary

Edward Hopkinson, M. P., is dead, at the age of sixty-two. He was one of the chief pioneers of electric traction in Great Britain. He belonged to a family which has long been famous in electrical and other sciences. Many years ago he carried out experiments at Portrush, Ireland on the first electric tramway constructed in the United Kingdom, and he designed the electric equipment of the Beesbrook and Newry tramway, also a pioneer line. Having joined the firm of Mather & Platt, he designed the electric plant and equipment for the City & South London Railway. This line, which was opened in 1890, was the first underground electric railway in the world, and represented the largest application of electric power for traction purposes that had been made up to that time. Mr. Hopkinson was also associated with other early electric traction undertakings and held a place of great distinction in his profession. The well-known Hopkinson test for dynamo machines is associated with the name of his family. His position in the scientific world is also indicated by the fact that he was a Doctor of Science of the University of London.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

Competition Causes Decrease in Light Rail Prices

Prices of light rails have been gradually sagging in the past week or two and are now \$1 to \$2 a ton lower. A close analysis would probably show that the market for delivery in the general Pittsburgh district is off about a dollar a ton and that an extra dollar has come off for delivery to points removed from Pittsburgh, particularly in the East.

Demand has been fully as heavy as formerly and has probably increased somewhat. In other words, the light rail market has been moving in much the same spirit as finished products generally, an increase in demand tending to stimulate competition, thus bringing out lower prices.

Mills still maintain that the market presents a differential averaging about a dollar a ton in favor of rails made from new steel as against rails rolled from old rails. With concessions on large lots or for delivery at points where freight rates make competition particularly active, rails made from new steel may be quoted at 1.40 cents to 1.45 cents and rerolled rails at 1.35 cents to 1.40 cents, making a general range for the base price, on 25 to 45-lb. sections, 1.35 cents to 1.45 cents, with the usual differentials for lighter sections.

\$400,000 for New Cars

The Pittsburgh (Pa.) Railways will purchase forty new cars at a cost of \$400,000. These cars are to be of the latest double-truck type with low floor and all steel construction and will be equipped with four motors, air brakes, fare boxes, heaters and other modern appliances. They will be built by the Pressed Steel Car Company and the motors will be furnished by the Westinghouse Electric & Manufacturing Company. Delivery is to commence in about 100 days and is to be completed about fifty days thereafter.

City Council Prefers Local Builder for Seattle Cars

As stated in these columns in the Feb. 18 issue, recommendation for the purchase of 200 new cars was made by Peter Witt for operation of the Seattle (Wash.) Municipal Railway. In considering this recommendation the City Council of Seattle feels that the work should be handled locally. The Pacific Car & Foundry Company, a Seattle firm, with shops at Renton, has made a formal proposition to the Council to construct these cars at cost plus 10 per cent. Superintendent Henderson of

the railway is also giving estimates of the cost for construction of the cars in the railway company's shops. The motor equipment will be purchased in the East as there are no local motor manufacturers.

Report Made on Car Surplus

Reports just received by the Car Service Division of the American Railway Association show that on Feb. 15 a total of 449,819 freight cars were idle because of business conditions, compared with 467,997 on Feb. 8. Surplus cars, that is cars in good repair and immediately available for service if necessary to meet traffic conditions, consisted of 278,481 of the total, while the remaining 171,338 represented the number of idle freight cars needing repairs in excess of the number normally regarded as being in bad order.

Steel Founders Meet

Operating representatives of the Electric Steel Founders' Research Group held a meeting in Milwaukee on Feb. 6, 7 and 8. This group was formed about two years ago for co-operative technical work toward improving the manufacture of steel castings.

At the Milwaukee meeting reports were made by the operating heads of plants on foundry problems that had been delegated by the group to the several companies. These included annealing, core practice, facing sands, furnace practice and pouring practice investigations.

Tokyo-Nikko Electric Railway

A company at Utsunomiya, Japan, is making arrangements to construct a high-speed electric railway between Tokyo and Nikko, at an estimated cost of 10,000,000 yen. Construction work is expected to be completed by next summer.

Metal, Coal and Material Prices

Metals—New York		March 7, 1922
Copper, electrolytic, cents per lb.	12.875	
Copper wire base, cents per lb.	14.125	
Lead, cents per lb.	4.70	
Zinc, cents per lb.	5.00	
Tin Straits, cents per lb.	29.00	
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.	\$4.675	
Somerset mine run, Boston, net tons.	1.875	
Pittsburgh, mine run, Pittsburgh, net tons	2.15	
Franklin, Ill., screenings, Chicago, net tons	2.00	
Central, Ill., screenings, Chicago, net tons	1.75	
Kansas screenings, Kansas City, net tons	2.50	
Materials		
Rubber-covered wire, N. Y. cents per lb.	5.90	
Weatherproof wire base, N. Y. cents per lb.	15.50	
Cement, Chicago net prices, without bags.	1.94	
Linseed oil, (5-bbl. lots), N. Y. cents per gal.	94.00	
White lead, (100-lb. keg), N. Y. cents per lb.	12.25	
Turpentine (bbl. lots), N. Y. cents per gal.	85.00	

Rolling Stock

Dayton (Ohio) Street Railway has purchased fifteen Economy meters for installation on its new light-weight cars now under construction by the Cincinnati Car Company.

Missoula (Mont.) Street Railway expects to use a 300 hp. electric locomotive for the purpose of pulling freight. It will also be used as a snow plow.

Interstate Public Service Company, Indianapolis, Ind., has placed a contract for five one-man double-truck cars. The cars cost \$11,000 each. They have a seating capacity of forty persons.

United Railways, St. Louis, Mo., through its receiver, has asked the court in charge of its affairs for permission to build fifty cars. They are to be of the "777" type, similar to the last lot of motor cars added to the system.

Track and Roadway

Brantford, Ont.—The City Council has approved the \$80,000 by-law for the extension of the municipal railway.

Hutchinson (Kan.) Interurban Railway is backing a movement to build a belt line connecting the Arkansas Valley with steam railways in Hutchinson.

Alabama Power Company, Gadsden, Ala., is repairing its track on Ninth Street and when this work is finished will rebuild the track from Forest to Cansler Avenue.

Chicago & Joliet Electric Railway, Joliet, Ill., will lay new tracks on Second Avenue and Boulder Avenue in the spring. This work is the result of a twenty-year franchise recently granted the company.

Wisconsin Public Service Company, Green Bay, Wis., will soon begin building its extension on West Walnut Street. An order for 200 tons of rail has been made. This will cost approximately \$12,000.

Tulsa (Okla.) Street Railway has started work on extending its Kendall car line one block east from the present terminus at College Avenue to the university athletic field. The Corporation Commission recently ordered this extension.

Philadelphia, Pa.—Sealed proposals for constructing signal towers and for furnishing and installing underground cables along the Frankford Elevated Railway were received at the Director's office, Department of City Transit, until noon on Feb. 28.

Claremore, Okla.—It is said that an offer has been made by C. Page of Sand Springs to the Non-Partisan Water Commission at Tulsa to build an electric line from Tulsa to Spavinaw via Claremore, connecting with the Missouri Pacific at Claremore. Free right-of-way for the Tulsa-Spavinaw extension is sought.

The New Orleans (La.) Railway & Light Company has placed an order with the Buda Company for a twenty-track carhouse layout. This work is to be built of A. E. R. A. 140-lb. 7-in. T-rail with solid manganese switches and manganese centers, mates and frogs. This company has also purchased two Universal rotary track grinders from the Atlas Railway Supply Company, Chicago. This business was handled in both cases by P. W. Wood, New Orleans, Southern agent for these manufacturers.

Power Houses, Shops and Buildings

New York, N. Y., Commissioner Whalen of Plant and Structures Department has recommended to the Board of Estimate the construction of a 12,000-kw. electric power plant on Staten Island at a cost of \$1,235,000 to furnish power for municipal piers, trolley lines, trackless trolleys and ferries.

Cookeville, Tenn., is now receiving power from its new municipal hydro-electric power plant at Burgess Falls, 12 miles below Cookeville, on Falling Water River. The installation has a power of 600 hp., but a unit of 400 hp. can be added at any time. Cookeville has previously had a steam plant.

Georgia Railway & Power Company, Atlanta, Ga., has completed the interconnecting power system whereby interchangeable high-power electrical service is given throughout the entire South. Work on the Tugalo power station which will increase the company's hydro-electric power 88,000 hp., is being carried on rapidly.

The Nova Scotia Tramways & Power Company, Ltd., Halifax, N. S., has signed a thirty-year contract with the Nova Scotia Power Commission for the purchase of electrical energy and power up to 18,000,000 kw.-hr. per year. The power will be furnished by the hydro development at St. Margaret's Bay near Halifax, a government project. The city of Halifax recently refused to take over the power produced by this development.

Pine Bluff (Ark.) Company is erecting a fully equipped receiving and sending radio station for experimental and demonstration purposes. This will be the first sending station of this radius in the state of Arkansas. It is a half kilowatt machine and will reach any of the Arkansas Light & Power Company plants in Arkansas. The Pine Bluff Company is under the same management. J. L. Longino, manager of the Pine Bluff Company, states that the aerial is to be on two 100-foot poles, placed near the company's main office here. The Arkansas Light & Power Company will equip its offices and plants at other Arkansas cities with receiving sets and instructions can be issued from the general office here to all branch plants. Trouble wagons are also to be equipped with wireless.

Trade Notes

Belden Manufacturing Company, Chicago, Ill., wire and cable manufacturer has announced the appointment of William P. DeVay as purchasing agent.

The Nichols-Lintern Company, Cleveland, Ohio, announces the completion of its new factory building, especially designed to meet its requirements. With the additional facilities now offered the demands for the company's car equipment apparatus will be speedily met.

Cummings C. Chesney, chief engineer and general manager of the Pittsfield Works of the General Electric Company, has been awarded the Edison medal for 1921 for meritorious service in electrical science or electrical engineering or electrical art. The work which won for Mr. Chesney this medal was the development of transmission apparatus, generators, condensers, transformers and converters while associated with the late William Stanley. The award is made by the American Institute of Electrical Engineers.

Reginal M. Campbell, well known in the electric light, power and railway fields, has resigned from the Habirshaw Electric Cable Company, to accept the position of special representative of the American Copper Products Company with headquarters in New York City. In his new connection Mr. Campbell will continue his activities in the fields he has specialized in for eighteen years. Prior to his connection with the Habirshaw company, Mr. Campbell was associated with the Ohio Brass Company. The American Copper Products Company, whose organization he has now joined, is one of the largest producers of copper products in the country. Mr. Campbell is a member of the New England Street Railway Club and the Railroad Club and Engineers' Club of New York.

New Advertising Literature

Industrial Works Bay City, Michigan, is distributing upon request catalog No. 113, illustrating and describing the type BC "Industrial" crawling tractor crane of 20,000-lb. capacity. This crane is adapted for use in railroad reclamation work and in storage yards.

The Four Wheel Drive Auto Company, Clintonville, Wis., has just issued a circular picturing and describing in some detail the installation of gasoline-driven cars on the Manhattan City & Interurban Railway, Manhattan, Kan., to replace the old electrical equipment.

Erie Electrical Equipment Company, Johnstown, Pa., has just issued a loose-leaf catalog of Erie fittings and devices. Some of the fittings included are panel-type fittings, wall and floor flanges, side outlet keys, insulator pins, parallel crosses, and various types of insulators for pipe support.

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Consider Capacity



Do you fully appreciate the capacity factor in hand-brake equipment?

Too often the mechanical man does not realize the need of reserve capacity in brakes. But the man on the road, unacquainted with the technical details, knows that a little extra slack or a kink in the chain may ruin his chances for an emergency stop unless his brake has ample and rapid chain-winding capacity.

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Meet Any Chain-Winding Requirement



Our brake normally will take care of 30 in. of chain—more than will be required generally by the largest electric cars. But a steam railroad company wanted a brake to handle 48 in. of chain. This requirement eliminated most of the other hand brakes. A slight change in the Peacock Brake was all that was needed to meet this unusual specification—and we got the order.

The Peacock Staffless Brake for safety cars has almost unlimited capacity to take up all the chain that comes, and stock it up in the generous housing space below the drum.

Don't risk the costly accident which may occur through some little oversight in brake adjustment or inspection. Get Peacock Brakes which have the capacity to function in spite of slack or defective adjustment.

Peacock Staffless Brake



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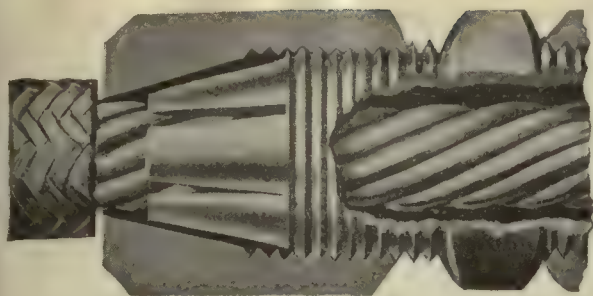
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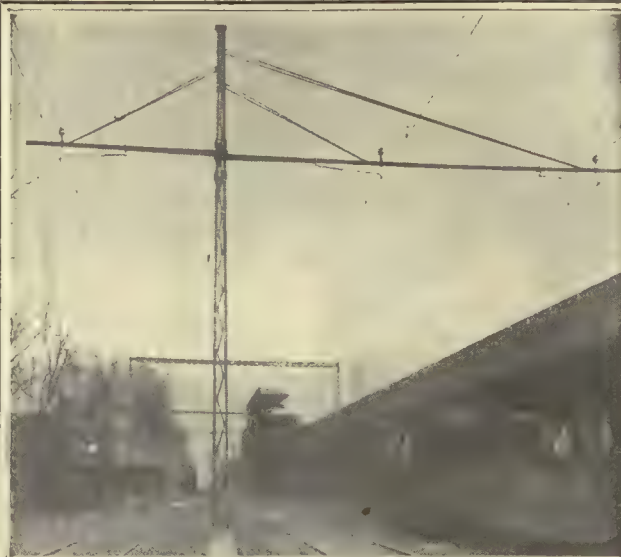
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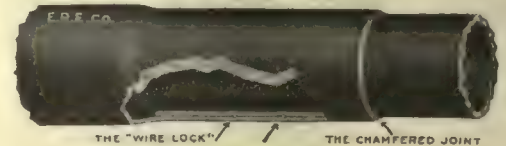
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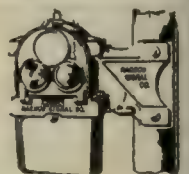
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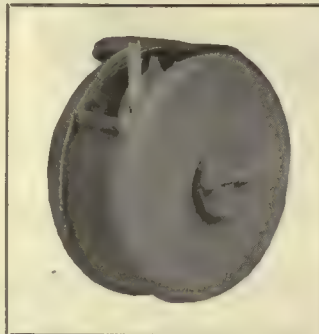
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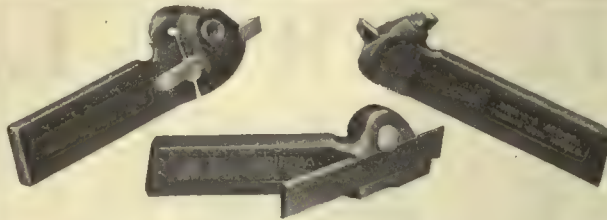
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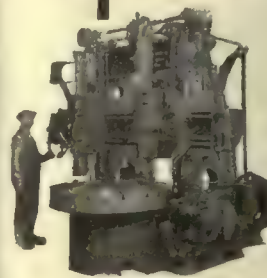
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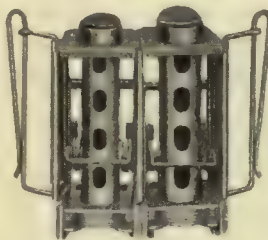
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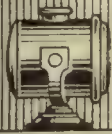


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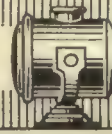


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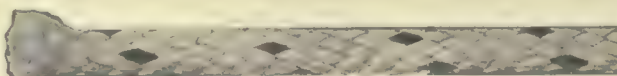
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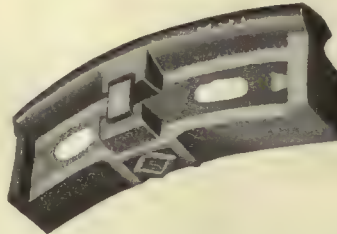
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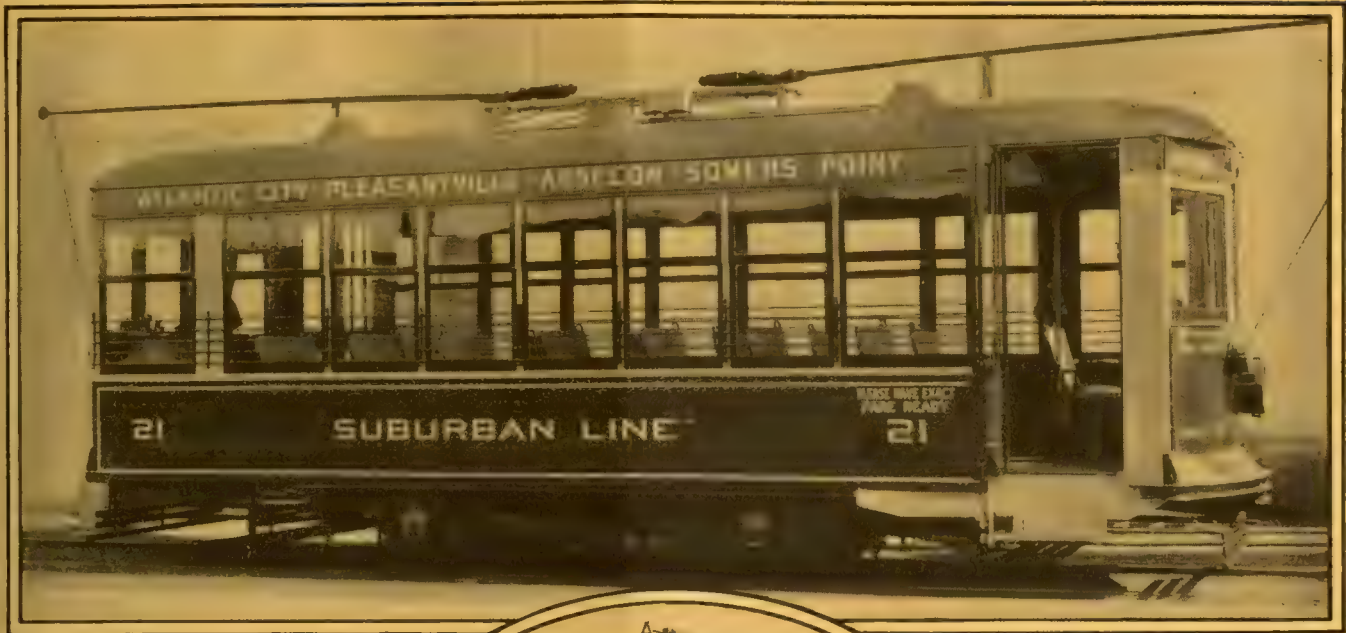
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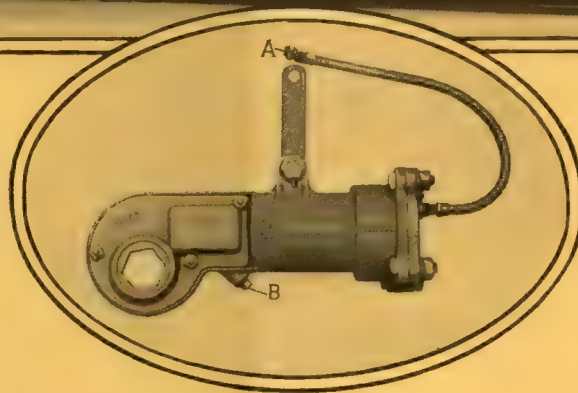
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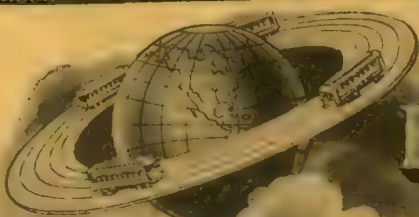
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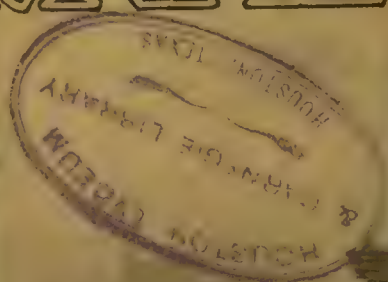
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Track Weather

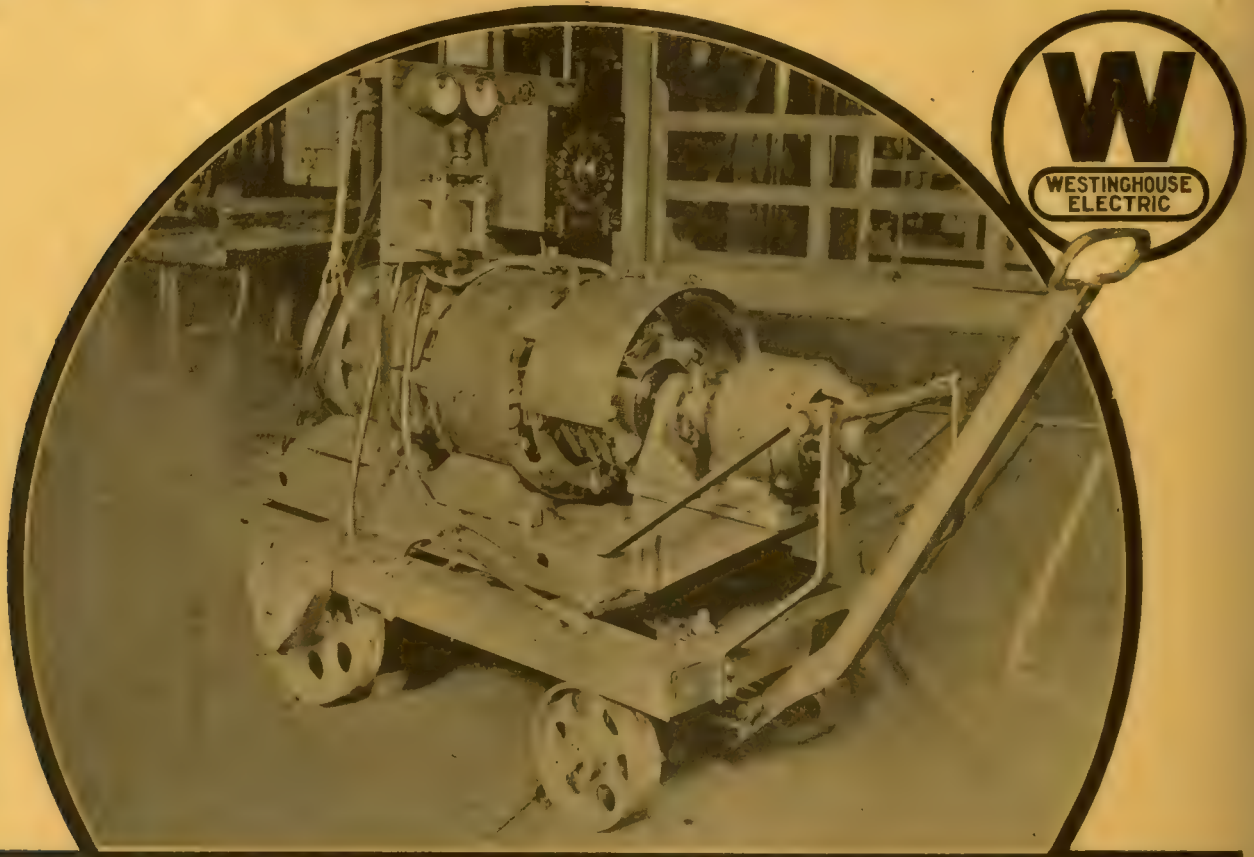
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A

"Do It Mechanically"

Number

FOR several years, ELECTRIC RAILWAY JOURNAL has devoted its third issue in March to a special treatment of the maintenance problems of electric railways. Each year shows progress in methods employed by the railways and in materials and tools which manufacturers produce for and furnish to the railways. Thus each "Maintenance Issue" is a record of the improvements in methods and in economies in maintaining railway property.

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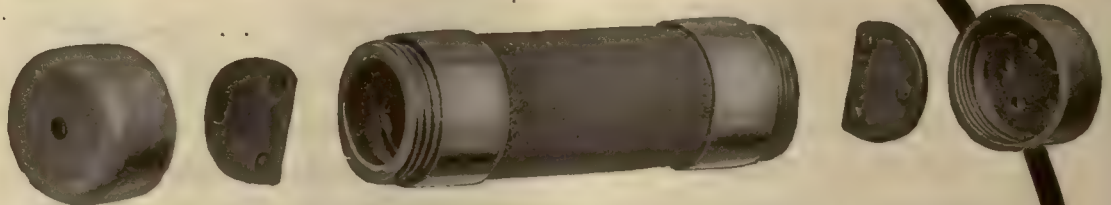


**Westinghouse Electric & Manufacturing
Company
East Pittsburgh, Pa.**



Westinghouse Shurvent Renewable Fuses

Ferrule Type
Shurvent Renewable Fuse



A new fuse, and the only renewable fuse with a scientifically designed venting path, that is used for venting only.

This positive vent construction is not dependent for satisfactory operation on "hit-or-miss" venting along the threads, but provides a separate path to take the hot gases of the blown fuse and deliver them into the outer atmosphere cool and harmless.

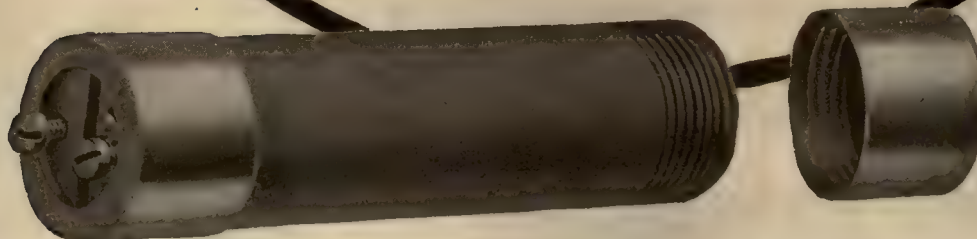
Westinghouse Shurvent Fuses are fully approved by the Underwriters' Laboratories in all capacities up to, and including, 600 amperes, 250 and 600 volts.

Write for folder 4472 describing these new fuses in detail.

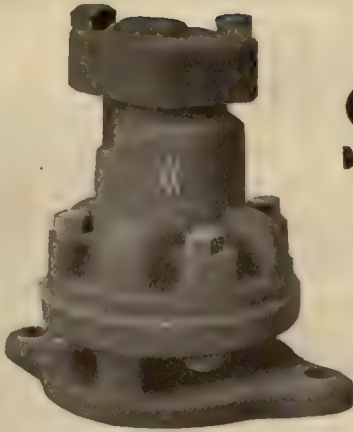
Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.



Knife-Blade Type
Shurvent Renewable Fuse



Westinghouse



"H" Emergency Valve

For further information on the advantages of the "H" Emergency Valve for changing over Straight Air equipments to include the automatic feature, write nearest district office. Ask for descriptive catalog T-2019.

Safe in Emergency

THE Westinghouse "H" Emergency Valve, with Automatic Feature, may be easily and quickly added to existing Straight Air Brake equipments in traction service so as to provide the well-known advantages of automatic action.

Incorporation of this emergency valve requires no change in the brake valve. The flexibility of the Straight Air equipment is not impaired and there is no change whatever in manipulation.

The "H" Emergency Valve offers an economical solution of an important braking problem.

Westinghouse Traction Brake Company

General Offices and Works: Wilmerding, Pa.

OFFICES:

Boston, Mass.
Chicago, Ill.
Columbus, O.
Denver, Colo.
Houston, Tex.

Los Angeles
Mexico City
St. Paul, Minn.
St. Louis, Mo.

New York
Pittsburgh
Washington
Seattle
San Francisco



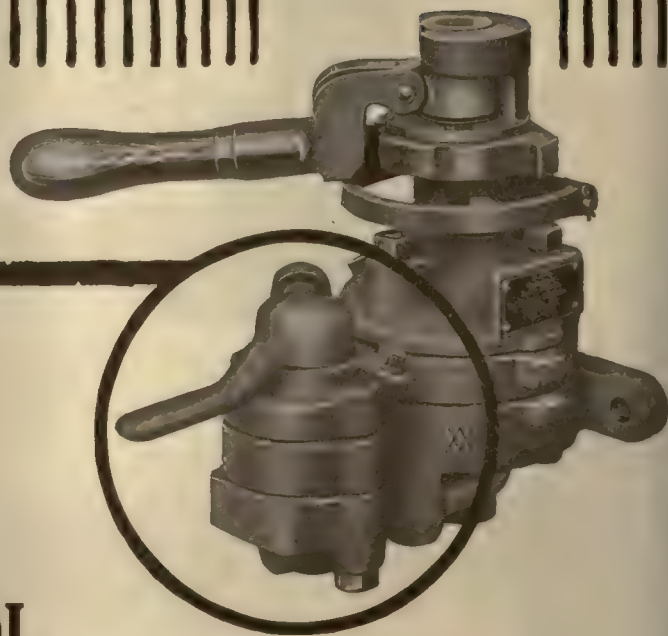
WESTINGHOUSE TRACTION BRAKES



**More Power
to the Motorman!**

GET

**INDEPENDENT
DOOR CONTROL**



With the New Selector Valve

ANOTHER advance in Safety Car development! A "Selector" Valve to give quick, easy, automatic door control for entrance only, exit only, or both simultaneously.

Three combinations—all at the discretion of the operator.

The "Selector" Valve is a new achievement particularly solving the problem of satisfactory door control on modified Safety Cars

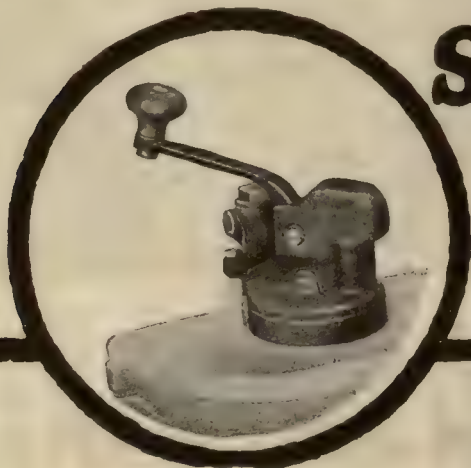
having double-passage, front-platform entrance and exit doors.

Affects car mileage by reducing time required to load and unload passengers.

Increases earning power of the equipment.

Gives the operator wider latitude in handling his car to the best advantage under all conditions.

Contributes generally to passenger-comfort, safety and good-will.



SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.

Postal and Telegraphic Address:
WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

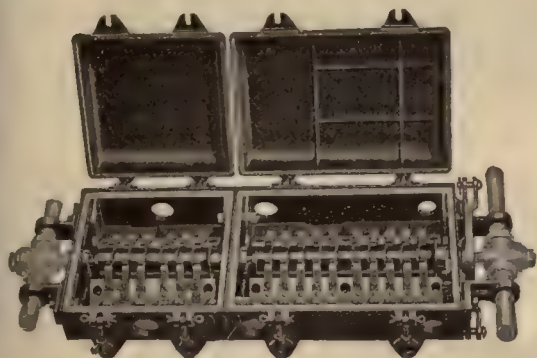
Mass Transportation with Tomlinson Couplers



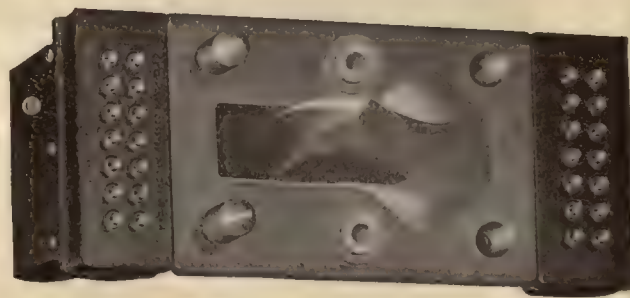
Nine car train equipped with Tomlinson Automatic Couplers

Tomlinson Form 9 Automatic Car Coupler (Patented)

From draft gear to draft gear the couplers are a single rigid unit. Mounted radially, and with a Tomlinson Spring Draw Bar Carrier, the coupler easily takes care of the sharpest of grade changes and the shortest of curves.



O-B Disconnecting Switch—Pat. Applied For
Air line and electric circuits are interlocked through this switch.



O-B Electric Couplers—Patented
As installed on Tomlinson Couplers which connect cars, air lines and electric circuits simultaneously—and safely.

The **Ohio**  **Brass** Co.
Mansfield, Ohio, U.S.A.



New York Philadelphia Pittsburgh Charleston, W. Va. Chicago Los Angeles San Francisco Paris, France
Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators

QUALITY TIES

**INTERNATIONAL
TREATMENT**

Ship Today Service

Treated ties in storage in one small portion of our yard at Texarkana, Texas, on February 1, 1922.

Having Seasoned Ties in stock ready for right-of-way distribution, we can serve the Railroad Field advantageously and economically.



"Creosoting is conceded to be the most effective of all treating processes" (Camp)

*International Treated Ties Reduce Maintenance Expense—
Insure Operating Efficiency*

CREOSOTED
TIES PILING POLES TIMBERS

International Creosoting & Construction Co.

General Office—Galveston, Texas

Texarkana, Texas.

Plants
Beaumont, Texas.

Galveston, Texas.



Snappy Service Coming On Those Frankford Philadelphia Cars

Three 4-ft. doors on each side mean least number of steps for the passengers.

National Pneumatic door control means *quick* opening and closing of doors.

National Pneumatic electric contact tripping shoe means *safe* opening and closing, the closing doors reversing at once if they touch a passenger.

National Pneumatic push-button control placed at car ends permits guard to control *two* cars at once; and there are outside buttons for station guards, too.

Finally, pilot lamps tell both motorman and guards that the doors are closed *right*.

City—Rapid Transit—Suburban—Interurban

These National Pneumatic Specialties Can Be Used by You

Door and Step Operating Mechanisms
Motorman's Light Signals

Door and Step Control
Safety Interlocking Door Control
Multiple Unit Door Control

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

National Pneumatic Company, Inc.
50 Church St., New York
Edison Bldg., Chicago
Works: Rahway, N. J.

Insurance plus Marsh & McLennan Service

Representatives

Representatives of Marsh & McLennan act as your confidential insurance advisers. They are men who have the confidence and the standing among insurance companies to plead your case, whenever they are satisfied that your rates are not a true measurement of relative fire hazard.

The service which Marsh & McLennan can render you is consistent with the service your legal advisers render. Do you place your insurance with the same care?

MARSH & MCLENNAN
175 W. Jackson Blvd. Chicago, Ill.

Minneapolis
New York
Detroit

Denver
Duluth
Columbus

San Francisco
Seattle
Cleveland

Winnipeg
Montreal
London



AJAX Electric Arc Welder

A 155 lb. high capacity resistance welder, especially designed and built for efficient maintenance of railway track.

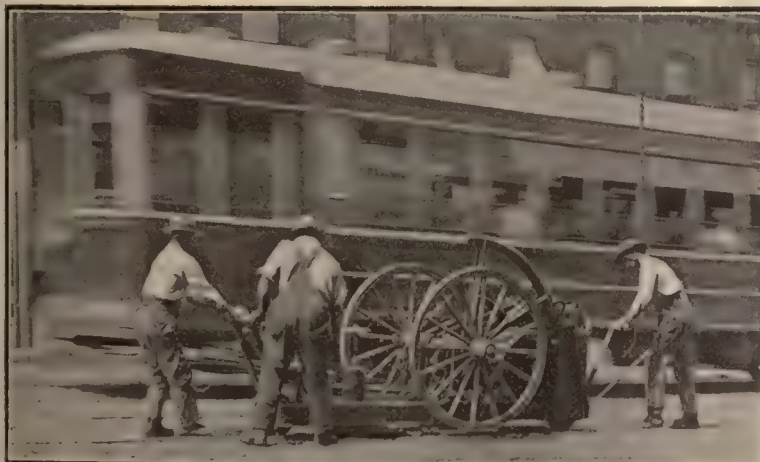
Get Busy Now!

*Don't delay that track rehabilitation
any longer!*



ATLAS Rail Grinder

An efficient rotary grinder, high speed, light and suitable for working under heavy traffic conditions.



RECIPROCATING Track Grinder

Unsurpassed for removing all trace of corrugations from straight and curved track.

RAILWAY TRACK WORK CO., 3132-38 E. Thompson St., PHILADELPHIA, PA.

Chas. N. Wood Co., Boston.

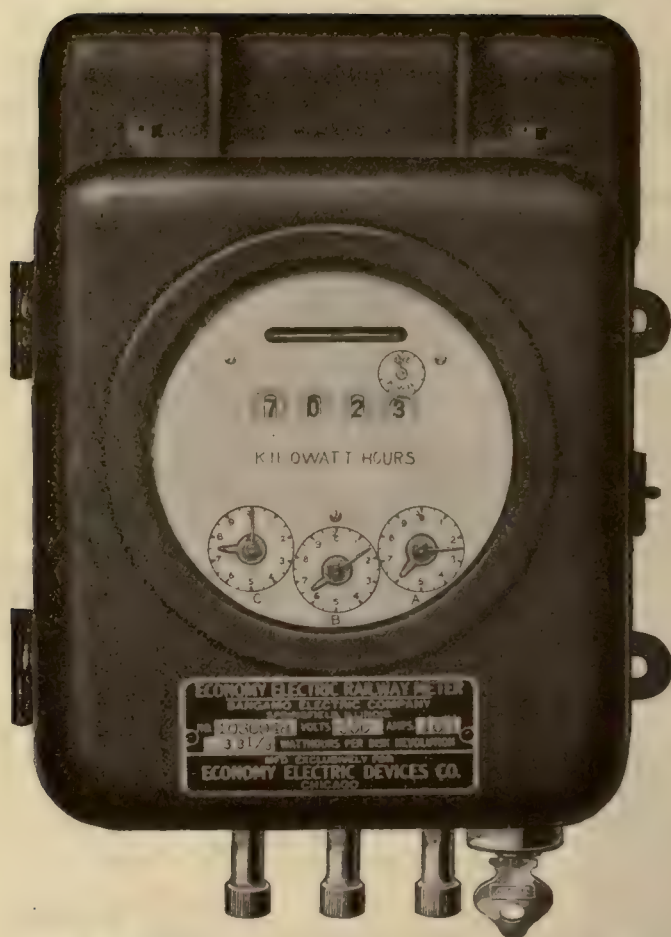
Electrical Engineering & Mfg. Co., Pittsburgh.

Atlas Railway Supply Co., Chicago.

P. W. Wood, New Orleans.

"I Would Have These Their Value From a

—And Every Bay State
With An Economy
Its Cost In Power



Note the Cyclometer Dial for the motormans power saving record, and the dials and set-back-hands below for indicating car inspection intervals.

There are 800 cars on the Bay State system of the Eastern Mass. Street Railway Co., and all are equipped with Economy Meters. These meters have clearly shown energy savings as high as $\frac{1}{2}$ K. W.-hr. per car mile.

There would still be 800 Economy Meters on these cars were there no power saving because the Superintendent of Equipment is satisfied that car inspection based on energy consumption is the most accurate and efficient measure of the actual work done by the car and its equipment.

It is safer, cheaper, and induces more thorough pit work than when inspections are based on either a time or mileage basis.

On more than 50 other properties there is a similiar conviction that car inspection by meter method is most efficient.

*The Economy Meter Saves Power at the
Car and Labor at the Carhouse.*

*ECONOMY METERS

Meters If Only For Maintenance Standpoint"

System Car Is Equipped With Meter Which Saved Three Years Ago

Here are fac-similes of two principal forms used by the Bay State system for car inspection. Each shows what inspection should be made when the hands on the corresponding meter dial get together.

Each meter has three inspection dials: "A" for 500-mile Brake Inspection; "B" for 1000-mile Car House General Inspection and "C" for 30,000-mile Shop Inspection.

When a car has done the kw.-hr. equivalent of 500 miles the hand of dial "A" will be near the heavy red marker. This car is then due for an "A" inspection. When this inspection is completed a key is inserted and the meter-driven hand is set back to the zero pin. The "B" and "C" dials operate the same way, but with higher kw.-hr. dial valves.

Note that the cars are called in for inspection only after they have received a predetermined amount of work and this without any clerical labor.

G 400B-11-16-21-8M					
Car No.		Date Due		Insp. No.	
Car Station		Meter Reading			
Eastern Massachusetts Street Railway Co.					
"B" DIAL INSPECTION					
(General Inspection)					
Part Inspected	Date	By Whom	Part Inspected	Date	By Whom
Air Brakes			Buzzers Button		
			Spare Lamps		
			Headlights		
			Bolts		
			Trucks		
			Wheels		
			Journals		
			Draw Bars		
			Fenders		
			Snow Scrapers		
			Sand Boxes		
			Foot Gongs		
			Pilot Boards		
			Roofs		
			Motorman Steps		
			Signs		
			Registers		
			Register Cords		
			Curtains		
			Seats		
			Cushions		
			Grab Handles		
			Hand Straps		
			Floors and Traps		
			Glass		
			Doors-Body		
			Steps-Body		
			Windows		
			Miscellaneous		

G 400A-11-16-21-8M		
Car No.	Date Due	Insp. No.
Car Station		
Meter Reading		
Eastern Massachusetts Street Railway Co.		
"A" DIAL INSPECTION		
(Intermediate Inspection)		
Part Inspected	Date	By Whom
AIR BRAKES—Inspect for condition and operation. Adjust for proper piston travel.		
HAND BRAKES—Inspect for condition and operation.		
EMERGENCY CONTROL—Inspect for condition and operation.		
MOTORS—Oil armature and axle bearings of G. E. 67, 80 and 90 motors.		

NOTES:—

All motors without modern oil wells are to be lubricated at both "A" and "B" inspections. Includes the G. E. 67, 80 and 90 motors.

All modern motors with oil wells to be lubricated at the "B" or General Inspection only.

The "A" inspection will always be made in full when making a "B" inspection.

REMARKS:—

SIGNED _____ FOREMAN CAR REPAIRS

CAR No. _____ DATE _____ Insp. No. _____

This car has been given an "A" Dial Inspection and is released for service at _____ A. M. above date.

SIGNED _____ FOREMAN CAR REPAIRS

Economy Electric Devices Company
L. E. Gould, Pres., Old Colony Bldg., Chicago

National Railway Appliance Co., New York
L. A. Nott, San Francisco

Cable Address: Sangamo, Chicago
Alfred Collyer & Co., Montreal, Quebec
Burton R. Stare Co., Seattle

Ludwig Hommel & Co., Pittsburgh
Grayson Railway Supply Co., St. Louis

*May we send
you an
estimate*

Standard on nearly 100 roads
Saving $\frac{1}{3}$ to $\frac{1}{2}$ cent per car mile

The track everlasting



The asphalt cushion protects foundation, saves rolling stock, roadbed, track and pavement.

DAYTON

saves \$6,000 per mile

Dayton Resilient Ties actually save this amount per mile of track over wood ties laid in concrete

—is this saving worth while to you?

IS THERE any investment you could possibly make which would pay anything like as large a return?

Think it over in these terms —

A saving of \$6000 per mile over wood ties in concrete!

A saving of \$2000 per mile over wood ties in gravel ballast!

Giving far longer life to the track —

Reducing track and paving repairs —

Reducing upkeep in rolling stock —

Reducing traffic noises.

These are the separate elements of economy which go into every purchase of Resilient Ties.

The time for track building and track rebuilding is nearly here; thinking in terms of costly wood-tie construction you have perhaps felt that you couldn't afford to undertake con-

struction for which there is real necessity.

We believe, however, that with facts and figures before you on the much lower cost of Resilient Tie construction, you will not only see your way clear to make the absolutely necessary track renewals but can definitely plan for track extensions as well.

These facts and figures as adapted to your particular problems are at your disposal any day you may care to take the matter up with us.

We can show you conclusively where you can put down *better* track for much *less* money than you had any idea of spending.

A request for these figures as applied to your particular problems will not put you under any obligation at all.

We want you to know and

IT WILL PAY YOU TO KNOW.

Write today for complete specifications and descriptions of Dayton Resilient Tie jobs.

THE DAYTON MECHANICAL TIE COMPANY
710 Commercial Bldg., Dayton, Ohio

Canadian Representatives:
Lyman Tube & Supply Co.
Montreal, Quebec

"They cushion the shock

Resilient TIE

—on rolling stock!"



Elreco Tubular Poles

Greatest Adaptability for Railway as well as Street Lighting Purposes

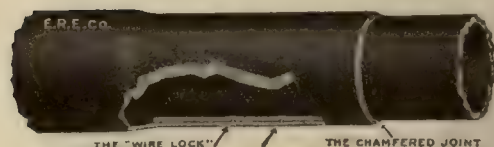
The conditions presented in the city of Lynchburg, Va., were met perfectly with Elreco combination poles. Rather narrow sidewalks, the requirements for both street railway overhead construction and for street lighting were all factors in the selection of pole equipment.

Notice how little obstruction of sidewalks there is; how little the overhead construction is noticed, and the pleasing and efficient provision for lighting.

Elreco poles, besides being sightly and doubly effective in the combination of lighting and street service, possess unusually great strength. Direction of load has no effect on the amount of strain produced by any load at right angles to the length of the pole.

Elreco poles are assembled with the exclusive wire lock swedge joint. The edge of the tube is chamfered, avoiding the possibility of rust or corrosion. It is impossible for these poles to telescope at the joints, either due to overload or by the drop test.

*Send for our catalogue with
complete data on the ad-
vantages of Elreco pole
equipment.*



Patented Wire Lock Swedge Joint



LYNCHBURG, VA.
ELRECO Combination Railway and
Lighting Poles.

Electric Railway Equipment Company
Cincinnati, Ohio

New York, 30 Church St.

"100% LIGHTNING PROTECTION"

with

***Keystone Expulsion Arresters
and Garton-Daniels Arresters
Coils, Switches, Fittings***



You Can Buy "100% Protection" From this Catalog

YOU can't change the weather but you can protect your property against the inevitable and treacherous lightning storms.

By protecting each of your average line transformers with Keystone Expulsion Arresters and your station and very important line apparatus with Garton-Daniels Lightning Arresters you will be well on the way to "100% Lightning Protection."

Your apparatus is too valuable to jeopardize for the sake of the small expenditure necessary to buy "100% Protection."

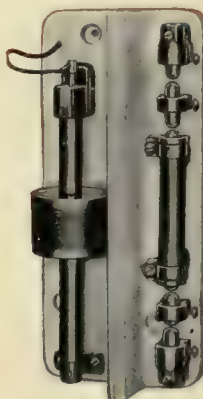
Such protection is your best insurance against damage to apparatus, shut-downs, losses in revenue and many other evils.

Our catalog gives essential information on lightning protection, but to supplement this we invite you to put your lightning protection problems up to our electrical engineers and thus secure the benefit of our 30 years' experience in this work.

BY ALL MEANS BUY "100% PROTECTION"



Keystone Expulsion
Type Arrester



Garton-Daniels A. C.
Station Arrester



Garton-Daniels D. C.
Station Arrester



Garton-Daniels
Pole Type Arrester

Keystone Expulsion Arresters are carefully packed in cartons and labeled so as to facilitate storing on your shelves and handling by your storekeepers and linemen. Also, they are unconditionally guaranteed for 1 year.



Sold by Electrical Jobbers the World Over

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Streets

NEW YORK
50 Church Street

CHICAGO
Monadnock Bldg.

Branch Offices: Boston, Scranton, Pittsburgh

Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver



This catalog will be sent on request

RWB Equipment and Engineering Service Reduce Maintenance Costs



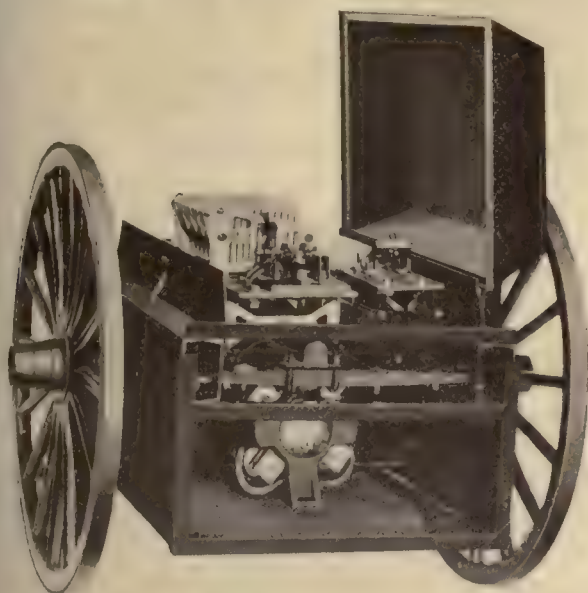
Type BB Dynamotor

Used for Carbon Arc Bonding, Metallic building up work on the track, such as worn and cupped rails, hard centers and manganese special work; both carbon and metallic shop welding.

The choice of the track welding and bonding equipment and the nature of the work it does is of first importance in electric railway maintenance work. With the proper equipment selected, a thorough knowledge of your own local track conditions is also essential to obtain long life of track and low maintenance costs.

Right along this line, we have made an extensive study covering track maintenance problems and as a result many electric railways using RWB equipment have realized large savings in their costs of track maintenance.

If you are contemplating new track construction, rail bonding, track repairs such as building up worn and cupped rails, hard centers and manganese special work or if you wish to fully rehabilitate old track in paved construction, the services of our Engineering Department and Laboratory are at your disposal.



Type WW Dynamotor

Used for Carbon Arc Rail Joint welding and in addition all classes of welding and bonding performed by the Type BB Dynamotor. The latter machine is recommended however for bonding on account of its added portability.

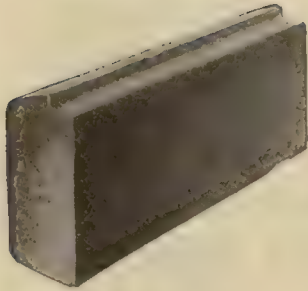
Rail Welding & Bonding Company
"Engineering Service"
East Cleveland, Ohio

NELSONVILLE

Filler and Stretcher Brick

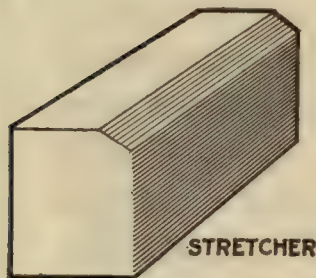
(Patented)

For Paving Along T-Rail in City Streets



FILLER BRICK—

Nine inches in length—different widths to fit the different rails. Made of fire clay and thoroughly vitrified. Laid parallel to the rail completely filling the space between the ball and base of the rail and doing away with ny other kind of filler.



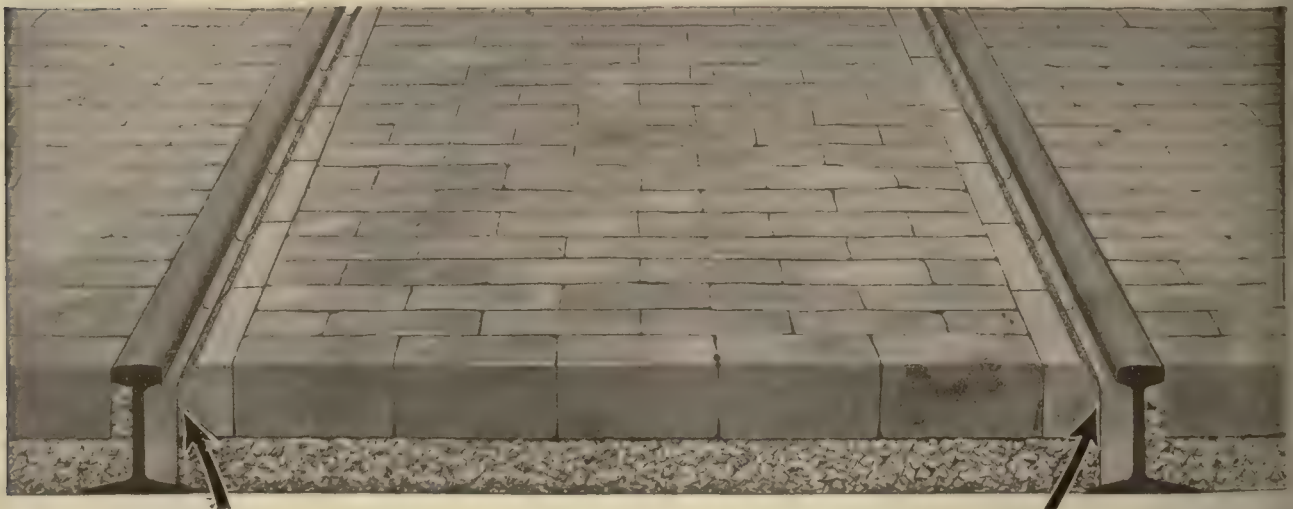
STRETCHER BRICK—

Nine inches in length. Made of fire clay, and, in fact, given the same careful attention as in the manufacture of standard paving block. Its bevelled edge and the groove in the filler brick complete the proper groove for the car wheel flange.

Simplify Construction—Reduce Maintenance
Send for Circular.

THE NELSONVILLE BRICK CO.

Columbus, Ohio



Deciding About That Track

—OLD or NEW, is EASY

The best is the cheapest—and when the cheapest is the best no need to hesitate.
Get prices on the "Ideal Track" the "Continuous Rail" kind, that is

"Jointless" "Bondless" and "Costless"

Indianapolis Welded Joints.....	Exterminate maintenance
Indianapolis Welded Joints.....	Low in cost, high in efficiency
Indianapolis Welded Joints.....	Super-rail, strength and conductivity
Indianapolis Welded Joints.....	Any rail, anywhere, any time
Indianapolis Welded Joints.....	Proven in performance—10 years' test
Indianapolis Welded Joints.....	In use on over 125 different rails
Indianapolis Welded Joints.....	In 200 cities, 48 states
Indianapolis Welded Joints.....	The last word in track economy

INDIANAPOLIS *Welded Joints*

Applied with the Indianapolis Electric Welder and with Indianapolis Fluxated Welding Steel.

Insures Dependable, "Continuous Rail Track," the only kind of track that will
ELIMINATE MAINTENANCE, PRESERVE PAVING, CONSERVE CARS

Thoroughly Dependable—Inexpensive—No Bolts—No Bonds—No Maintenance.

The Proof of the Product Is In the Performance.

ONE SAYS: Have installed 3,000 pairs since 1917. Thoroughly satisfactory and efficient in every respect. Economical and adopted as standard.

ANOTHER SAYS: Have over 6,000 pairs, first installed in 1913, consider them thoroughly practical and satisfactory, standard with us.

ANOTHER SAYS: About 2,500 pairs installed since 1907, with very gratifying results.

ANOTHER SAYS: Installed 2,400 pairs, be-

ginning in 1916, with very satisfactory results.

ANOTHER SAYS: Since 1912 have used about 3,000 pairs, standard for our paved tracks.

ANOTHER SAYS: Only began in 1919, with 500 pairs, uniformly good results.

ANOTHER SAYS: Joints welded in 1916, no maintenance and track apparently "Jointless" today.

ETC., ETC., ETC., ETC., ETC., ETC., ETC.

That "INDIANAPOLIS" *Welders, Steel and Joints*

ARE GOOD, is our claim. That they DO GOOD, is your opportunity. That they have MADE GOOD, is conclusively proven, in that many properties owe their present existence to the use of these products, which are saving hundreds of roads, MILLIONS of DOLLARS ANNUALLY.

To Users—The MORE you USE the MORE you SAVE.

To Not-Yet Users—JOIN THE SAVERS.

GET OUR PROPOSITION FOR COMPARISON

The Indianapolis Switch & Frog Co.
SPRINGFIELD, OHIO



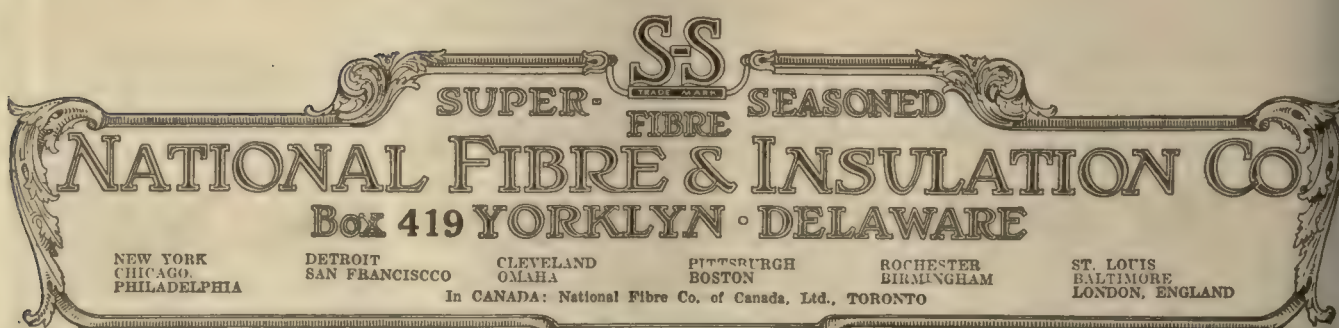
A new insulating paper that is made without grain. Hornflex bends and folds in any direction without cracking, and is high in dielectric strength.

A special surfacing takes and holds shellac or varnish better, thus adding to the life of the paper.

Hornflex is made in sheets or rolls from .005 to 1-32 of an inch in thickness.

Let us send you samples of Hornflex big enough for your own testing on your own motors in your power shops.

Ask for "S-S" Book giving full information in regard to Super-Seasoned Fibre in sheets, rods, tubes and fibre specialties.



You will get "Value Received"
in the purchase of the
**Erico Series Type
Arc Welding and Bonding Outfit**



Series Type Outfit, arranged for Arc Weld Bonding

Because

A modest initial investment will give you a rugged portable bonding outfit that will apply both the Erico Brazed and Erico Arc Weld Bonds quickly and economically—an outfit that is built to stand the grief of your most severe bonding and arc weld repair service.



Type "ET" Brazed Bond, cheapest in extended application, highest in conductivity.



Type "AT-F" Arc Weld Bond, most convenient for "pick-up" bonding.

Get our interesting bonding cost data

The Electric Railway Improvement Co.
Cleveland, Ohio



N-L INDICATING SIGNAL

to the chauffeur, as the boy darted
in front of the car

N-L Indicating Signals are used in many of the leading cities of the continent on more than five thousand cars, because—

A definite signal from the car to the following traffic has the same value as the definite signals from the auto driver and the traffic cop.

Imagine the chaotic conditions without driver and cop signals.

Ask yourself, "Are our cars doing their part?"

N-L Indicating Signals make for more coasting, reduce false brake movements and practically wipe out rear end accidents.

*This Toronto car is equipped with
N-L Type B Ventilators*

THE NICHOLS-LINTERN COMPANY
7960 Lorain Avenue, Cleveland, Ohio

N-L Products Manufactured and Sold in Canada by
Railway & Power Engineering Corporation, Ltd., 133 Eastern Avenue, Toronto, Ontario.

A FABLE BASED UPON REAL FACTS.

THERE WAS once an ELECTRIC RAILROAD Company WHOSE ENGINEERS claimed that VARNISH WAS the least of THEIR TROUBLES and whose PURCHASING AGENT bought the CHEAPEST STUFF he could THE LOWEST BIDDER always CARRIED AWAY the bacon. AND NATURALLY supplied the CHEAP STUFF upon which HE QUOTED until one FINE DAY the management WOKE UP and asked HOW MUCH base or USEFUL MATERIAL it contained PER GALLON and found the PENNYWISE POLICY had been CARRIED SO far that FOR EACH gallon of VARNISH BOUGHT they got THREE QUARTS of gasoline AND ONLY one quart OF USEFUL filling or COVERING MATERIAL and also THAT THEY could have PURCHASED FOR only six CENTS MORE per gallon A PRODUCT which contained 53 PERCENT of base AND THEREFORE worth at LEAST TWICE as much. CAN YOU beat it?

variation in weight of solvents used, You must determine yourselves the percentage of base or let others do it for you. If you want help or exact information concerning the products which you are using as compared to what may be obtained write, stating your case, and look into the merits of heavy bodied black or clear —

To the Man who "can't afford" Sterling Varnishes.

Find Out!

competent men will tell you for the asking.



NO MATTER whether you are a repairer of only a few motors or a manufacturer building thousands, you will find that our research department is interested and will be glad to show you why heavy bodied varnishes are worth buying and to explain how the determination is made. It is surprising how few people realize that the fable in the margin may apply to their own methods of purchasing and how very few take the trouble to find out. Varnishes of the same class are intrinsically much the same as far as ordinary tests can show. Those which, other things being equal, contain the most base, or useful material are unquestionably the best buy. Specific gravity is no criterion on account of the

STERLING VARNISH

THE STERLING VARNISH COMPANY, PITTSBURGH, PA.

Tulc meets all the requirements specified by bearing manufacturers

THE foremost manufacturers of ball and roller bearings in this country are agreed upon the general requirements of proper lubricant for their products. The specifications for lubricants for these special bearings are:

To protect the highly polished surfaces

Acid content 0.1% or less

Alkali content 0.1% or less

Not to develop acid with age

Must be scientifically compounded

Contain no abrasive particles

Low ash content

Must not harden or gum

Free from saponifiable oil

High melting point

Low cold test

Requires the use of a high grade mineral oil in its composition.

"Overall Specialists"

The service men who work with you on your lubricating problems are not "experts on theories." They put on overalls and get right down to brass tacks—pack your cars—*show* you how and why Tulc should be used. They get results—real money-saving results—99 times out of a hundred. The hundredth time there is no charge for the service.

Tulc has all of the above requirements, and no faults to offset its advantages. The grade 2VH is generally used for ball and roller bearings, but any grade we manufacture will meet the above specifications.

Tests by your own staff will prove these statements, or we will send a service man to conduct any test on your own property.

Tulc No. 2 VH—Also absolutely the best lubricant for trolley wheels, HL control, K type controllers, brake cylinders and engineer's valves.

The Universal Lubricating Co.

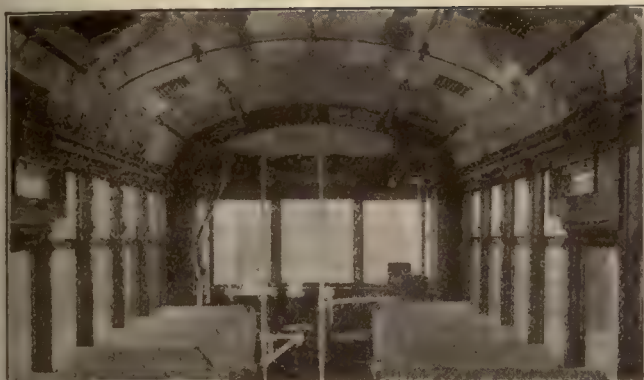
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Chicago's New Model Safety Cars are Roofed and Lined With HASKELITE For Strength and Light Weight

THE following quotations are taken from the leading article in the January 14th issue of the "*Electric Railway Journal*," which describes two new types of safety cars recently placed in operation by the Chicago Surface Lines:

Construction Features of Single-Truck Car

"The body roof is made of $\frac{1}{4}$ -in. 3-ply poplar HASKELITE, scarfed and glued across the car at the center to form a continuous panel. The vestibule hoods are made of tongue-and-groove $\frac{5}{16}$ -in. poplar sheeting, butt jointed to the body roof. The header carline under the joint is rabbetted to allow the roof to come flush. The headlining is $\frac{1}{8}$ -in. 2-ply HASKELITE. The body headers are paneled with $\frac{5}{16}$ -in. 3-ply HASKELITE with gum toward the interior of the car, and poplar on the vestibule side. The body side lining is made of $\frac{3}{16}$ -in. 3-ply HASKELITE."

Construction Features of Double-Truck Car

"The roof construction is very similar to that used on the single-truck car, with the exception that the 3-ply

HASKELITE roofing was made in three sections, butt jointed and fastened at the carlines. As in the single-truck car, the vestibule hoods were made of tongue-and-groove poplar sheeting, while $\frac{3}{16}$ -in. 3-ply HASKELITE was used for the headlining."

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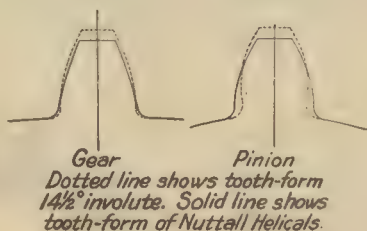
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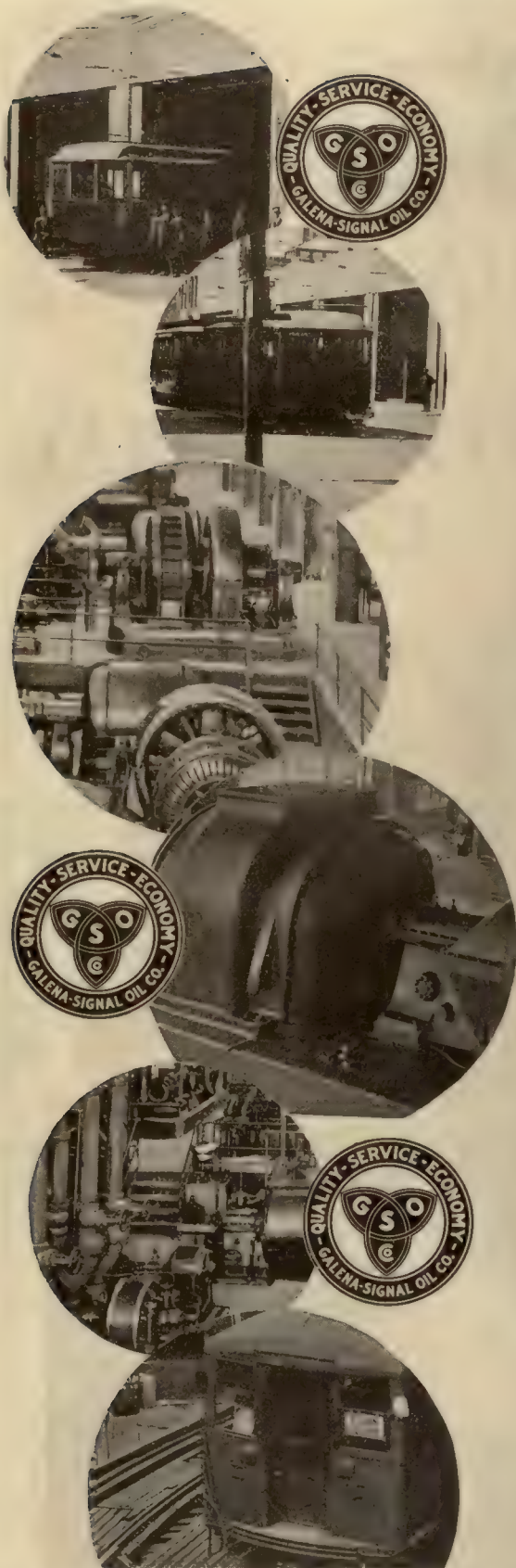
Five years ago the Milwaukee Electric Railway & Light Company decided to test out the economies of Differential Cars. They bought two Differential Cars then. Now they'll have *twenty-four*.

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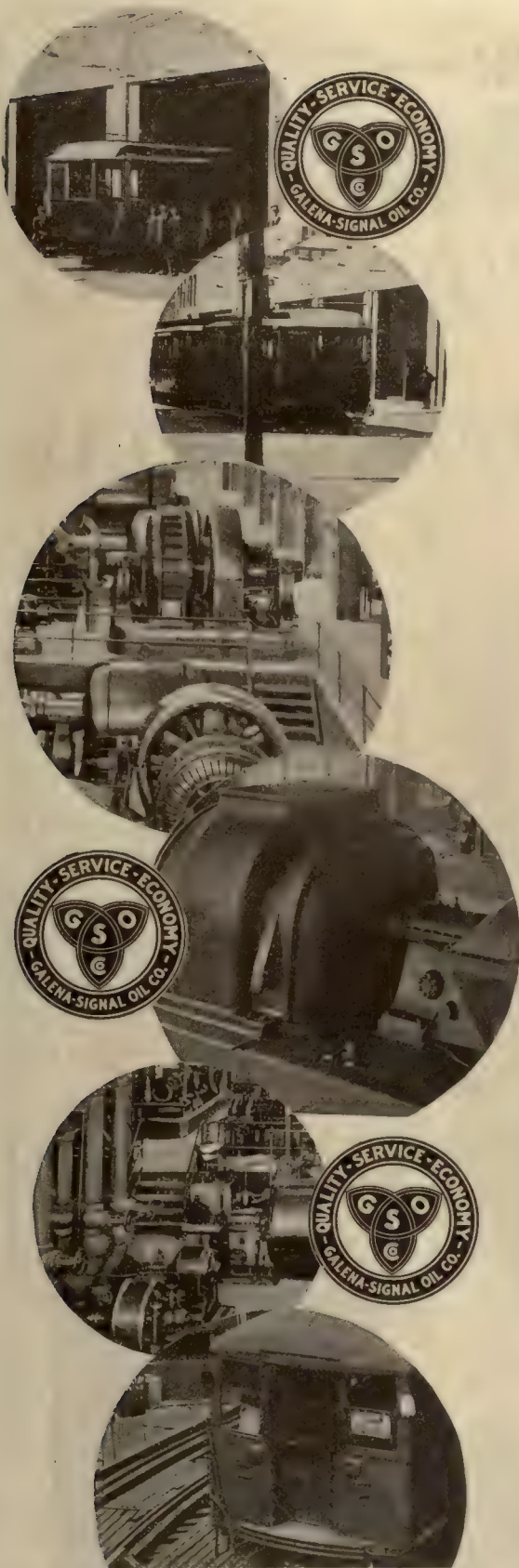
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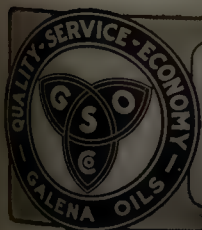
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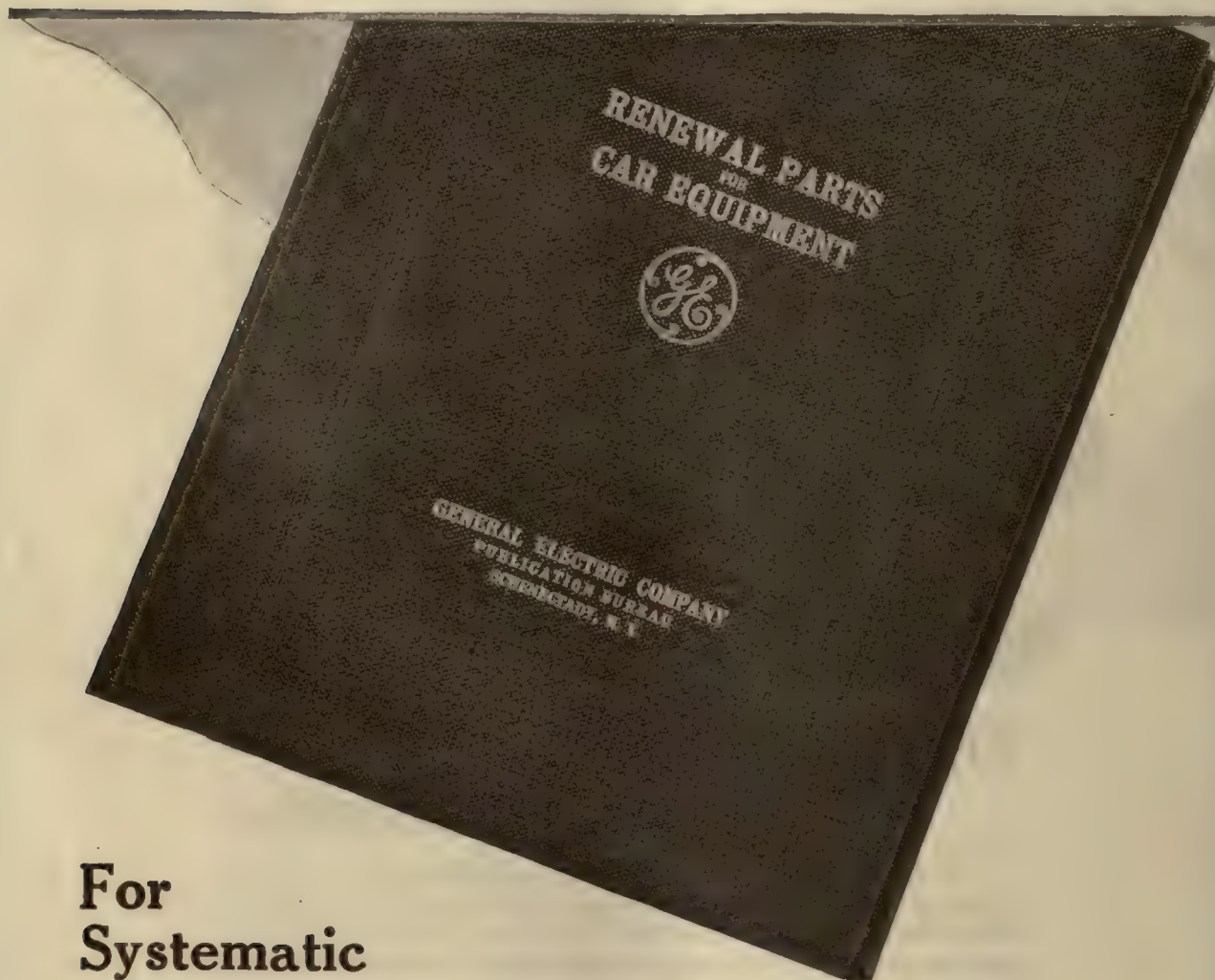


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Number 11

Reducing the Operating Ratio by Cutting Labor Costs

THIS issue of the **ELECTRIC RAILWAY JOURNAL** has been planned to give its readers practical information on some of the labor-saving methods and types of materials-handling equipment which have been found useful by electric railways. The need for more efficient location of equipment, better shop organization and more widespread use of labor-saving equipment has long been recognized. The present necessity for taking advantage of every means for reducing costs and improving methods is so urgent, however, that the presentation of new evidence and the restatement of familiar facts are timely in order to impress on maintenance department executives the economies that will result if measures to improve conditions are actively undertaken.

Industry in all its branches is now concentrating its efforts toward a reduction of labor costs. The value of materials-handling devices in keeping up output and controlling costs was demonstrated during the war. The lessons learned should now be applied toward reducing costs and speeding up work in railway maintenance departments. A comparison of the methods used by up-to-date maintenance shops with those of smaller and less fortunate electric railways shows that the latter do not turn out work as quickly and as efficiently as the former. This is undoubtedly due to the fact that the former provide special machinery for doing various classes of work and use methods of scheduling and performing detailed operations which are laid out to give the greatest output. Particular attention should be devoted toward perfecting the output per man and providing necessary labor-saving and materials-handling equipment in order to increase this efficiency. If railway maintenance departments desire to increase their output economically they can accomplish much by using better materials-handling methods and equipment. The cost of new or additional equipment can usually be quickly saved through reduced cost of labor.

Selling Its Own Association to the Electric Railway Industry

ON MARCH 15 the committee on company and associate membership of the American Electric Railway Association inaugurated its much heralded campaign for new members. Never before in the history of the association has a membership campaign been planned so comprehensively and organized so systematically as this one. There is all the more reason, therefore, that the whole association should pull together in making the campaign a success, because lack of full success would be much more conspicuous than if the plans had been less comprehensive. To speak bluntly, it's the duty of every one to help the committee put this thing over.

The bystander might ask the question, "Why all this

effort if association membership is such a good thing?" Such a query is easy to answer; for all service, even of the highest type, must be sold, and it is harder to sell than tangible, physical things. This statement applies to education, religion, journalistic service and so on. In this case, however, the problem is somewhat simplified by the fact that the American Association is a co-operative organization. It has, therefore, a stronger appeal than would some service that might seem extraneous to the industry.

Don't Make a Manufacturing Plant Out of the Maintenance Shop

THE opinion that manufacturing is outside the electric railway company's field and is seldom justified is frequently expressed. There may be circumstances where it is permissible; for example, when remoteness from the manufacturer adds considerably to the cost to transportation and makes quick delivery impossible. Another case may be one in which the volume of shop work is not sufficient to keep the men busy, so that the manufacture of some simple part can be used to fill in. The deciding factor should be that of economy, and in this respect railway officials can be easily misled by inaccurate cost accounting. Where the same force of men is used for both manufacturing and maintenance work the determination of dependable shop cost data is almost impossible. They must be determined, however, if costs are to be controlled.

The manufacturer organizes and equips his plant to carry out a definite order of operations. The workmen perform the same operation over and over again and become highly skilled at it. Machinery is carefully located to expedite movement and promote efficiency. Required tools are near at hand and needed materials are ready with promptness and in the proper place to obviate unnecessary handling. All operations are co-ordinated and carefully planned with relation to the next following or preceding one to avoid lost motion or delay in production. A specially organized production department plans the order of procedure and provides jigs, special tools, dies, etc., for rapid and efficient manufacture and to insure interchangeability of the parts when completed.

All this is quite impossible in a railway shop where a large variety of work is done. The demands made by operating requirements of a railway will not permit a corresponding degree of perfection to be obtained. The variety of work done by each man and its relatively small amount prevent the handling of the work as it is handled in manufacturing plants. There is more lost motion and the atmosphere of orderly routine which pervades a well-managed factory is lacking.

Manufacturers emphasize the value of effective supervision and strict discipline and they can take advantage of piecework to insure a proper relation between the employee's pay and his output. Railway shops, on the

other hand, are prevented from taking advantage of these economies by the restrictions of public control. As the railway supplies only its own demands, the quantities of material are small compared with the amounts used by manufacturers. The railway is thus not able to secure the lower prices of material which go with purchases in large quantities.

Manufacturing by electric railway shop forces should not be undertaken unless definite and enduring economies are gained. If such manufacturing is found advisable, it can be carried out much more efficiently and economically if the manufacturing department and its operation are definitely separated from those of the maintenance shop with the great variety of operations which it is called upon to perform.

Oblivion as a Policy

THE ideal condition for a public utility, in the opinion of a manager who has spent many years in the business, is when the public accepts its service as a matter of course. "They will never," he said, in expressing this view, "go wildly enthusiastic about the utility or be deeply grateful to it for the service it gives, and there is no reason why they should. If they go to the corner to take a car or turn the electric switch when they want light, because those two are the natural things to do when light or transportation is desired, the public relations of the company supplying the service are perfect. Its ambition should not be that of being foremost in the customer's thoughts when he has to use the car or electric service. Instead, its greatest wish should be to be forgotten. Oblivion is the end to be sought."

There is much to be said in favor of this idea. The same thought in regard to a nation is expressed in the proverb: "Happy is the country which has no history." Such a condition for a utility is far better than where the customer's first thought when he has to wait unduly for a car is that the company is and always has been inefficient, or where the company is, in disfavor for one reason or another, even when the service is good. The same thought has been expressed also by the wish of some utility men that their company's name will keep off the first page of the daily paper, and that all events about it shall be chronicled purely as news in a short note or notes in the inside pages.

Nevertheless, while there may be some advantages, it is not the best condition for a country to have no history or for a utility to have no particular civic standing in the city where it operates. In many cases it is one of the largest if not the largest enterprise and taxpayer in the community, and for this reason if for no other it cannot lose its identity entirely, even if it would like to do so. Much that it does and many of its plans are of great interest to the public, which should be told about them, not in a blatant way, but simply and clearly through some means of public information.

A country without a history may be happy, but its citizens cannot take a vast amount of pride in it or have any strong sense of patriotism. In the same way, a utility which is practically unknown to those whom it serves may not incur their disfavor so long as things go just right, but it cannot be as strong in the community as if it had an established reputation for following a fair policy and being up to date.

Making Up for Lost Time in Deferred Maintenance

WHEN a man buys a piece of property, such as a house or a factory, he considers in connection with the price that he will pay the cost of putting the property into good condition if it is at all run down, and property that is changing hands, excepting that which has been built especially to be sold, is apt to be considerably out of repair. Just so in the larger case of a public utility which is being sold. Change of ownership in either case is apt to be accompanied by a wholesale liquidation of deferred maintenance. Thus a property like the railway in Toronto or Toledo, in passing from hand to hand, is given a thorough overhaul; money can be obtained for such work because the new owners are willing to give the property a fair show; they realize that they cannot expect it to demonstrate its full capacity as a money earner unless it is put into the pink of condition. And they know how to find this money under such circumstances.

The conditions in regard to backward maintenance which are made evident, and even conspicuous, in connection with a change of ownership are to some extent prevalent on all railway and railroad properties in this country today. Net incomes have been augmented, or deficits reduced, in part by cutting maintenance appropriations. This is unfortunate; if carried too far it will prove suicidal or confiscatory, depending upon the source of the compelling force which caused the appropriation slashing. There are, however, signs of improvement; managers, boards of directors and public service commissions are apparently realizing both the conditions and the possibility of finding money somehow. Fortunately, also, the costs of most of the elements of maintenance are coming down. This fact should be utilized to permit the making up of lost time in maintenance work, and fares should be reduced slowly enough to make it possible to recoup the impairment of capital caused by deferred maintenance.

When a full realization of the effects of further deferring rehabilitation is reached there will be a rather sudden reaction. The expenditure of millions of dollars within a few recent months in Toronto for this work illustrates on an extreme scale what must happen generally on a smaller scale very soon. Now is the time to get ready for the coming activity. As in Toronto, the careful preparation of plans and specifications, the utilization of standards which have been developed by the national engineering associations and the wise provision of labor- and time-saving machinery will in the end bring big returns.

Continue the Use of Labor-Saving Devices in Track Maintenance

FOR some reason expenditures for track maintenance are usually the first to feel a cut when times are hard and the last to be resumed when times get better. It may be taken as an index that better times are at hand when the news columns of this paper begin, as they are now doing, to record large track programs to be undertaken by the different companies.

In considering these programs the engineers should not overlook the fact that the times just passed have served at least one good purpose in teaching the value of labor-saving devices in track construction and maintenance. Probably no other means would have taught

the lesson that labor costs could be lessened, even at increased rates of wages, by the use of labor-saving machinery and tools. Having learned the lesson, it should be their plan to continue the use of such devices and at the same time to attempt an even more intensive application thereof. The fact that the labor rate is lower furnishes no reason for any let-up in the saving of labor; there are yet a number of operations in track maintenance which are ripe for the application of labor-saving methods and devices. For instance, there is room for the development of some mechanical means for loading excavated materials, such as old concrete, earth and paving materials, upon work cars following the removal of the materials from the track. Most of this work is still done manually and there must be some way to do it mechanically, in part at least, at a lower labor cost. There are, of course, many operations which will continue to require manual labor, but the slogan should be "find a way or make one" to do it mechanically."

It Is Up to the Men Now

FINANCIAL success in the electric railway business depends more and more on the little economies. It is these economies multiplied by the tremendous units in which the business deals over the period of a year that make or mar profits. Almost from the start under Mr. Mitten in Philadelphia it has been greatly to the interest of the employees there to be careful in little things. Under the new plan for participation by the employees of the company in the profits of the company the men and women there will have more at stake than ever before. As matters now stand it is not stretching the point any to say that the proposal now under way in Philadelphia for employee participation in management and in profits after a return has been made to stockholders is an experiment that merits much wider attention than it has apparently received so far.

Participation in profits by employees is, of course, not a new idea, though it has not been practiced to any great extent in the public utility field. In the Philadelphia case, however, the plan may be regarded as starting under particularly auspicious circumstances because there is a background of understanding and respect between management and men, built up over a period of more than ten years. During this time the effort has been gradually to educate the employees to a realization of the responsibilities imposed under the plan which will now go into effect.

The idea behind the Philadelphia proposal should be looked at impersonally. There is a good deal of prejudice in human nature. Mr. Mitten understands this perhaps much better than do his critics. As a result of the accomplishments of the past in Philadelphia under the policy of co-operative management the employees naturally are jubilant at the election of the entire Mitten slate to the board of directors and at the prospects ahead of them the coming year. Back of it all, however, evidence is not lacking that the employees realize more than ever before the burden that now rests with management and men, and that with success has come greatly added responsibility. If the spirit of the employees at Philadelphia as exemplified there in the past twelve years is any criterion for the future, then the lesson of what they will accomplish during the coming year may afford one

of the brightest pages in the history of industrial relations. The management has done its part. It is up to the men now.

How Can Engineers Function Collectively?

THIS is an engineering age, and there are many national, state and municipal questions on which the views of the engineering profession as a whole would be most helpful. The problem is to make these views articulate. It was in recognition of this condition and with a sense of obligation to render such public service as they could collectively that the engineers of the country, by and large, formed a federation of their various national and local societies. Organized in the fall of 1920, this federation—The Federated American Engineering Societies—is still hunting the best answer to the question "How Can Engineers Function Collectively?"

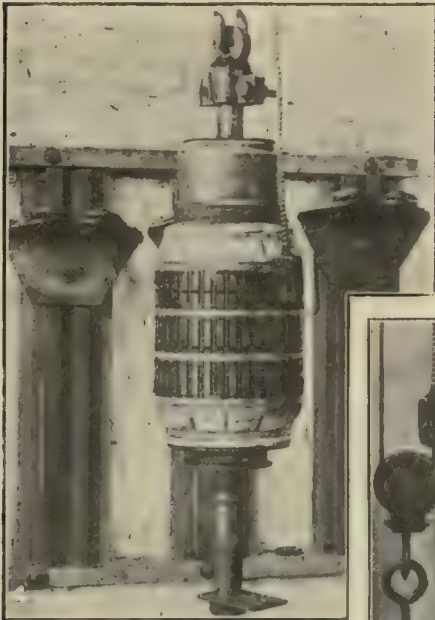
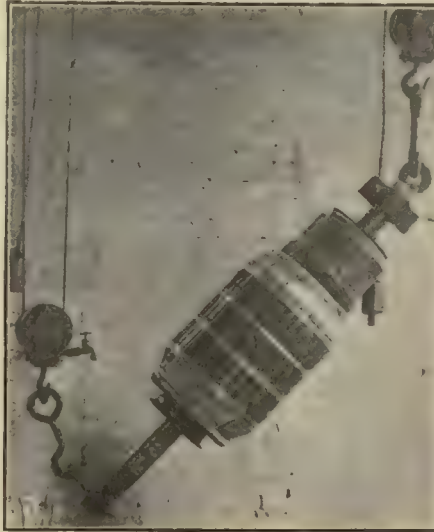
During the first few months of its existence, the Federated Societies moved forward under the stimulating leadership of Herbert Hoover. The conception and the preparation of the report on the elimination of waste in industry gave point and direction at the start to the activities of all engineers. The problem now before the federation is to effect an every-day working method of collective action by engineers, and this is a two-part problem, namely, (1) to find those broad subjects in which all engineers may have a definite interest in the field of their common activity, and (2) to give collective expression to the views obtained on these subjects. The body of men making up the executive board is fully aware of the necessity of so organizing the work of the federation that both these objects may be attained. At last week's meeting of the executive board in Chicago President Cooley, just returned from a swing around the circle of member societies, gave voice to the thought that the principal program to be worked out during the immediate future is not so much to study and report on different subjects as organization and method.

The list of accomplishments of the meeting in Chicago is a list of resolutions tabled, and from one point of view seems to indicate a complete failure of the federation to function. Looking deeper than the surface indications, however, the problem is better stated by saying that the questions came before the federation in such a form that it was not possible to pass intelligent judgment upon them, and the federation is to be commended for refusing to go on record on a group of problems of which it had no intimate knowledge.

All this may seem somewhat foreign to the electric railway business. Actually, it is closely related, for two reasons. One is that the electric railway industry is an engineering industry and contains many engineers whose voice will be eventually heard on problems which the federation must consider. The other is that once collective engineering action and opinion is made effective in the service of the nation, the electric railway industry will be better understood by the public and will share in any benefits which are generally effected.

So, to this effort of the engineers, encouragement should be given. Little by little, the federation is making progress in its problem of organization. When this is solved engineers will be able to do collective work effectively.

Handling Armatures for Dipping and Baking



No. 1—Delivering armature to traveling crane serving dipping tank.

No. 2—Changing to vertical position in preparation for dipping.

No. 3—One of the two hoists lowers armature into tank, prior to dipping.

No. 4—After dipping, the armature is lifted to the adjacent drain rack.

No. 5—Special drain rack holds armatures in tilted position and permits easy rotation.

No. 6—Removing armature from drain rack and changing to horizontal position.

No. 7—Armature placed on truck by crane hoists for transfer to oven.

No. 8—Rolling armature from truck to oven rack.

No. 9—Double racks on either side of aisle in oven give capacity of twenty-four armatures.

No. 10—Automatic contact which permits insulation testing from outside of oven.

Expediting Armature Repair Work

Features of New Baking and Dipping Outfit in Kansas City Railways Shop Are the Special Provisions for Efficient Handling and Testing of the Armatures—Insulation Condition of Each Armature Can Be Followed as It Bakes—Experience Related as to Best Practice in Baking Process

BY HENRY S. DAY

Equipment Engineer Kansas City (Mo.) Railways

AN ELECTRIC baking oven with special facilities for handling, dipping and baking armatures was designed and installed on this property by the writer during 1921. Baking ovens are now in rather general use, and in the main the methods followed are about the same, although there is still much discussion as to how the varnish should be applied, how the armatures should be drained and how long they should be baked. The object in view in working out the scheme installed in Kansas City was to provide equipment and facilities which would reduce to a minimum the handling operations and make possible the repairing of armatures on a quantity production basis with correspondingly low labor cost.

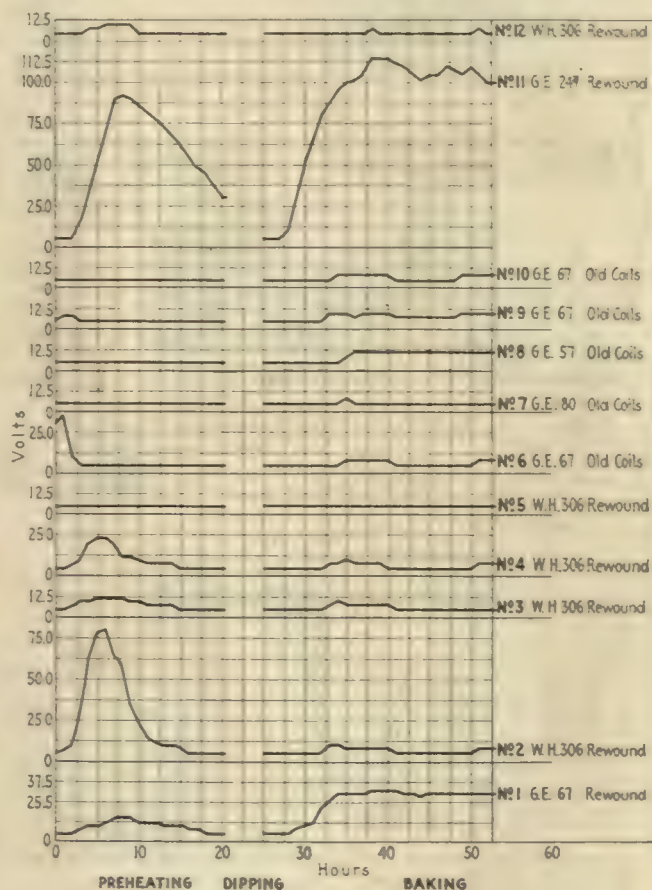
The new oven is divided into two compartments, each being an exact duplicate of the other and operated as an individual unit. Each compartment has rack capacity for twelve armatures, six on either side, with an aisle between racks in which a 34 $\frac{1}{2}$ -in. gage track extends entirely through the oven and to the extreme end of the section of the shop where this repair process is carried on. Both ends of the oven compartments are equipped with doors that are connected with counterweights, which have proved to be an excellent feature, as the doors are easily and quickly raised or lowered and remain in whatever position is desired. The installation of doors on both ends of the compartments has also been well worth while as they increase the flexibility of the oven and make it possible to pass out armatures from either end so that there is no waiting time between operations. The arrangement of having an aisle between racks gives ready accessibility to any particular armature or to field and miscellaneous coils stacked on skeleton shelves placed on the racks when armatures are not being baked.

The oven is set on a concrete floor. The walls and roof are constructed of $\frac{1}{2}$ -in. sheet iron and 1-in. sponge asbestos supported on 1-in. special channel iron. The outside is $\frac{1}{2}$ -in. sheet iron which is insulated from the channel iron with $\frac{1}{2}$ -in. transite, thus providing a $\frac{1}{2}$ -in. air space. Nearly all seams are welded, and tests have shown that there is very little radiation of heat.

After many tests to determine the best baking temperature, the thermostatic control was set to cut the electric heaters in at 230 deg. F. and out at 240 deg. F. With this automatic heat control the ovens require no attention from the operator during the baking period. The heating units are standard Westinghouse equipment, type C oven heaters, and also the control, including push-button switches which automatically cut off the current from the heaters whenever the doors are opened.

For placing armatures in oven, a steel-frame, four-wheel truck is used which has fixed levels matching up with both the upper and lower tier of racks in the oven. The armatures are thus easily rolled by hand from truck to rack and vice versa. The truck wheels are fitted with

roller bearings so that even with a maximum armature load the truck is readily moved by hand. The brackets are faced with copper, as are also the racks in the oven, so as to protect the armature shafts. When an armature is placed on the truck it is prevented from rolling off by a taper pin inserted in a hole drilled in



TYPICAL INSULATION CURVES FOR ARMATURES IN COURSE OF DIPPING AND BAKING

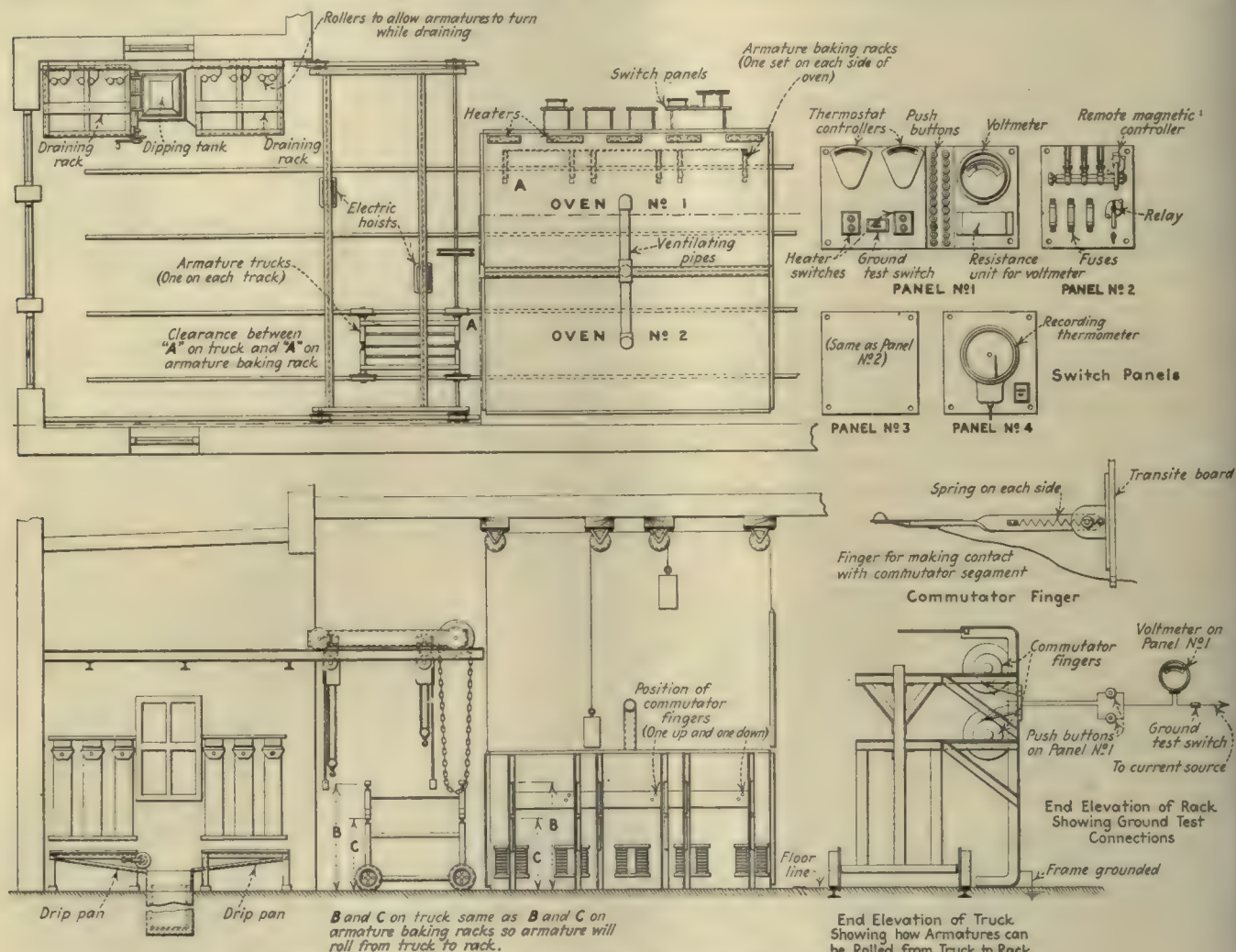
the armature rest. This pin is chained to the truck to prevent its being lost. The truck will hold two armatures at a time, one on either level. The design of the truck eliminates the necessity of raising or lowering an armature in order to transfer it from truck to rack or vice versa. Hence one operator can easily and quickly push the truck into the oven and roll the armature onto the rack ready for drying or baking.

Reference to the plan drawing reproduced herewith will show that the section of the shop at the end of the oven where the dipping is accomplished is served by an overhead traveling crane equipped with two electric hoists. This crane serves the entire section for both compartments and each compartment is served by its individual oven truck, such as has just been described, for transferring the armatures in and out of the oven.

Armatures are dipped pinion end down and immersed in varnish up to the commutator ears, but not over. The draining is done by supporting the armature so that it rests at a sharp angle with the vertical. This is obtained by setting the pinion end of the armature shaft on a center pin and leaning the commutator end against two rollers supported on slides against the wall. Thus supported on a steel-point center the armature can easily be rotated. As soon as an armature is removed from the varnish and placed on the drain rack the operator gives it a quarter to a half turn at short intervals, according to the way it drips during the entire draining period. With the armature at the angle de-

As the lengths and diameters of the armatures handled vary considerably, the dipping tanks were built with a false wooden bottom which can be raised and lowered by a small hand windlass. As soon as an armature is lowered to the desired depth in the varnish, the bottom is raised until it carries the weight of the armature, and the windlass is locked there by a dog. A wooden framework is then secured to the upper or commutator end of the shaft, holding the armature in an exactly vertical position so that the crane and hoist can be released for other work.

When the draining of an armature has been finished and it is ready for the oven, the front hoist on the crane



PLAN, ELEVATION AND DETAILS OF BAKE OVEN AND EQUIPMENT, SHOWING COMPLETE LAYOUT

scribed this thoroughly drains all free varnish and prevents pocketing and unbalancing. Differences in lengths of armature shafts were taken into account by mounting the rollers in slides to permit them to be raised or lowered easily.

As it was desired completely to immerse the armature in the varnish, pinion end down, a bottle-shaped clamp was designed, having a copper lining to protect the shaft, and arranged to be clamped over the commutator end. This allows the armature to be lowered into the varnish in an exactly vertical position. The copper lining of the clamp not only protects the shaft but supplies sufficient friction to make the clamp perfectly safe. This clamp is put on when the armature is first brought to the dipping tank and it remains on the shaft until the armature is dipped and drained and ready for the oven.

is used to lift the armature from the drain rack into the air. The pinion end is then picked up with the rear hoist and the armature is returned to a horizontal position and placed on the truck for transfer to the oven. Accompanying photographs show the sequence of operations from the time the armature is delivered to the crane from the floor truck to the time it is placed on the racks in the oven.

INSULATION IS TESTED PERIODICALLY WHILE ARMATURES BAKE

A feature of this oven which has been found to be of great value is a method of testing the insulation of each armature while it is in the oven. This is shown on the drawing and also in one of the photographs. The arrangement consists of a contact finger mounted on a

transite board and fitted with springs so as to provide pressure against the commutator. This contact is arranged to snap forward or back of the center so that when it is disengaged it will snap back out of the way, and as soon as an armature is placed on the rack a slight movement again snaps it against the commutator. The contact is connected through a 500-volt push button, a voltmeter and a switch to a 500-volt circuit. With the racks in the oven grounded, this gives a ground or insulation test. Each armature location in the oven is numbered, the lower tier being odd and the upper even to correspond with the numbers on the push buttons. The twenty-four push buttons thus make it possible at any time during a baking period to take a voltmeter reading for any armature and determine the insulation condition without opening the doors and cooling off the oven. While most armatures will show much the same curve of voltmeter readings, an occasional one will require special treatment and this arrangement eliminates all guesswork.

It will be noted that the drawing shows a ventilating duct for each oven compartment, but not much stress has been laid on this point. Both natural and forced ventilation have been tried and tests of several different batches of armatures made with each method of ventilation, and also without any ventilation, and little if any difference has been found in the results obtained.

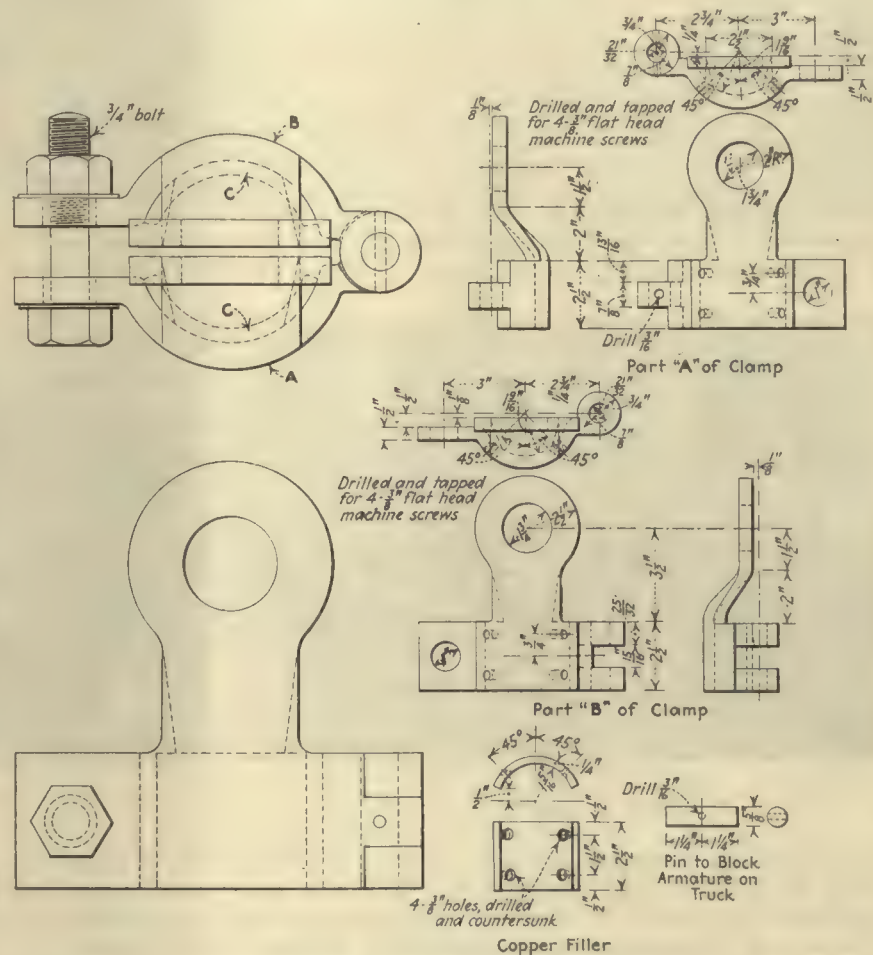
PREHEATING, DIPPING AND BAKING TIME DETERMINED

Just how long an armature should be preheated, allowed to remain in the varnish, drained and finally baked, seems to be a matter for each engineer to decide for himself. In the end, the time allowances depend on the results obtained if the tests leading up to the results have been carefully worked out. Results with this oven unquestionably have been excellent, and after many lengthy tests certain standards have been adopted and are now being followed in the daily operation. These standards are very simple. All armatures, both old and rewound, are preheated from twelve to fourteen hours. As a rule all armatures will test practically clear with this number of hours of preheating, but if any armature in the batch shows a high voltage reading it is kept in the oven until it comes down. If the reading grows constant near the peak the armature is taken out and the trouble located, even if this requires removing bands and lifting coils. Sometimes a rewound armature with green coils will show a reluctance to clear, but eventually will come down with sufficient heating.

After preheating, the armatures are dipped in varnish having a specific gravity which is kept as nearly as possible at 0.875 Beaumé by the addition of new varnish or benzene and allowed to remain in the varnish until all bubbling stops. This of course indicates that all air pockets have been penetrated. The armatures are

then drained from fifteen to twenty-five minutes and then placed in the oven. When the oven is charged to its full capacity it is closed up and the heat turned on and kept on from twenty-five to thirty-five hours. Readings are taken at intervals during the baking period, and unless some one or more armatures show a high voltage reading, the oven is opened at the end of the normal period and the armatures released for commutator turning and slotting, if necessary, as soon as they are cooled.

When the oven was first started various tests were made with and without ventilation, some over a period of ninety hours in which ten-minute voltmeter readings were taken from start to finish. The chart shown here-



first taking an armature that had actually baked sixty or seventy hours and examining the condition of the insulation by opening the windings and then working back in the same manner on armatures that had been baked for shorter periods, it was eventually determined that this twenty-five to thirty-five hour period was sufficient.

The following table gives the capacity of the oven with both units working up to, maximum:

FIRST BATCH OF TWELVE ARMATURES			
Monday	5:00 P. M.		In for preheat
Tuesday	7:00 A. M.		Out for dipping
	10:00 A. M.		In for bake
Wednesday	4:00 P. M.		Out; end of bake period
SECOND BATCH OF TWELVE ARMATURES			
Wednesday	5:00 P. M.		In for preheat
Thursday	7:00 A. M.		Out for dipping
	10:00 A. M.		In for bake
Friday	4:00 P. M.		Out; end of bake period
THIRD BATCH OF TWELVE ARMATURES			
Friday	5:00 P. M.		In for preheat
Saturday	7:00 A. M.		Out for dipping
	10:00 A. M.		In for bake
Sunday	4:00 P. M.		Out; end of bake period

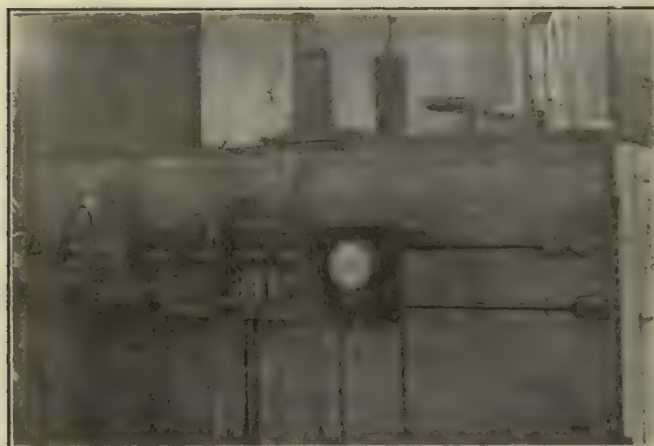
This schedule produces thirty-six dipped and baked armatures per week for each compartment, or a total of seventy-two armatures from the oven. This also

take care of the normal overhaul program. This amounts to 2,500 armatures per year, over which the interest charge is spread, or an interest charge per armature of 14.4 cents. Adding this to the \$2.76 labor and material cost above, the total cost per armature is \$2.91.

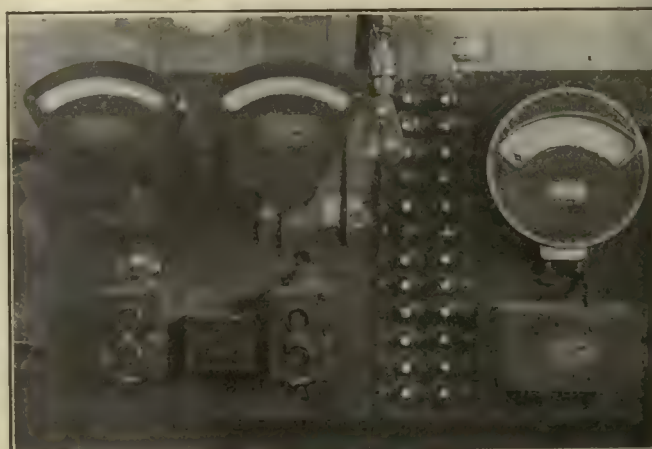
OPERATING RESULTS WILL DECIDE BAKING PERIOD

Some engineers may claim that with this cost per armature the expense is too high to justify the process, but the results already obtained on this property contradict such a claim. The question has also been frequently discussed as to how often an armature should be dipped and baked. It would probably be difficult to set up any given period of time or number of miles for an armature to remain in service between baking operations, but on this road it has finally been decided that all armatures and field coils will be dipped and baked when the cars are put through the shop for the regular overhaul, which is conducted on a 45,000-mile basis, or approximately every sixteen months. Following this schedule has already substantially reduced the number of motor failures.

A great deal of time and study has been given to the design and use of this baking outfit in order to obtain



CONTROL AND TEST EQUIPMENT AS INSTALLED ON SIDE OF BAKING OVEN



CLOSE-UP OF PUSH BUTTONS AND INSTRUMENTS FOR TESTING ANY ARMATURE IN THE OVEN

gives from 4 p.m. Sunday to 7 a.m. Monday, or fifteen hours, for baking coils, etc., without interfering with the maximum capacity of the oven. This schedule can, of course, be adjusted for greater capacity if desired.

With energy delivered at the oven at 1½ cents per kilowatt-hour, varnish at \$1.87 per gallon and two operators at 45 cents per hour, it is costing \$2.765 per armature to bake and dip. This cost is figured from the total number of armatures dipped and baked per month without regard to size and comprising G.E. types 57, 67, 70, 80, 247 and 258, and Westinghouse types 506 and 306. This cost has been carefully checked and is very close to the exact cost of the operation.

The total investment in the baking oven and auxiliary equipment in the Kansas City shops amounts to very close to \$6,000. It should be explained that this investment includes from \$1,500 to \$2,000 of development costs, which would not be involved in building another similar installation. To get at the total cost per armature, including overhead, interest on the \$6,000 investment is figured at 6 per cent, or a total per year of \$360. While the total capacity of the baking and dipping facilities is seventy-two armatures a week, the actual production will be about forty-eight a week, as this will

the best possible results. Whether or not the best results have now been attained is not yet certain, but the study from now on must be one of service observations. For instance, the writer was always inclined to a longer baking period, but as the results with the time and method described are certainly good, it is the intention to continue the work along the present lines and keep a close check on operations at the oven and the performance of the armatures in service, and from time to time make any changes that may be suggested from the data gathered.

Report on Rail Corrugation

A COMMITTEE of the Municipal Tramways Association in England which for the past five years has been investigating the subject of rail corrugation has recently made a report. This states that all observations lead to the conclusion that corrugation of steel rails is inseparable from the action of heavily loaded wheels rolling along the surface of the tread of the rails. It appears that this rolling originates the corrugation by giving rise to superficial stresses in the material of the rail tread which are in excess of the elastic limit and of the toughness of the material.



ONE OF THE SEVERE GRADES OF THE MARKET STREET RAILWAY SYSTEM

Give Your Motors a Chance to Make Good

Through Careful Attention to Maintenance Details the Market Street Railway of San Francisco Operates Old Type Motors in Extremely Severe Service Without Excessive Trouble

BY J. M. YOUNT

Master Mechanic Market Street Railway, San Francisco, Cal.

RECENTLY the Market Street Railway constructed some new cars, and in giving the motor manufacturers the data it was stated that the motors for each car should be four 40-hp. and of an interpole ventilated type. The cars were to weigh 40,000 lb. complete, and all other data were given. One manufacturer refused to guarantee the service temperature of the motors under the conditions given. This caused us to stop and reflect: Why would not the manufacturer guarantee new, up-to-date motors for a service in which we were using old motors of much smaller size with satisfaction? Here we were operating 33 per cent of our cars, weighing 42,000 lb., with four 35-hp. GE-1,000 motors purchased between the years 1900 and 1903, on lines with grades as high as 13 per cent. These motors were performing economically from every standpoint.

As most all electric railways have a considerable number of old-type motors, it may be of interest to know of our system of handling the 900 GE-1,000 motors which we have in daily service. On account of the big fire in 1906 and the strike of 1907 our car equipment did not get the care due it. In 1910 we were looking with envy toward those companies that were replacing the GE-1,000 motors with up-to-date equipment. There was no hope for us in the way of new equipment, however, on account of finances, so we kept a record of the principal faults of this type of motor, and then we endeavored to provide a means to overcome them. The principal trouble consisted of grounded commutators, flashing over at commutators, bent brush holders, bent brush holder yokes, open circuits in leads, holes burned in neck of connections and field terminals burned off.

The above troubles seemed to have about condemned the motors to the scrap pile. We found that the

grounded commutators could be traced to the oil from commutator end bearing creeping over onto the string band, collecting carbon dust and thereby eventually causing a ground. We substituted solidified oil and waste in place of oil for lubrication and there was an improvement. Next we eliminated the string band and oil linen from the mica ring and painted the mica ring and face of the commutator with a paint made of shellac and oxide of iron. Since then grounded GE-1,000 commutators have been rare.

The problem of reducing the number of flashovers was a difficult one, as there were so many things that could cause this trouble. A century field tester was purchased and a survey was made of all the field coils in use. The result showed 600 fields short circuited. These were replaced with impregnated fields, which produced an improvement. Commutators were next slotted, and a proper carbon brush was selected, another improvement. Brush yokes and holders were set with a templet and brushes were checked to insure proper spacing. Now in place of going over 13 per cent grades in series, a four-motor car weighing 42,000 lb., equipped with GE-1,000 motors, loaded with 125 passengers, takes the grades in full parallel without flashing. We paint our brush yokes with the same paint as is used on commutators. Open circuits in leads and holes burned in connections, in the majority of cases, can be traced to mechanical faults, such as loose commutator shells, loose end bells or loose core laminations.

We are very particular before rewinding a core to see that commutator shells, end bells and laminations are as they should be. We have replaced the cast-iron nut that holds the laminations together with a steel one made from a section of a fifteen-tooth pinion. We are



MOTOR CLEANING AND OVERHAULING DEPARTMENT

able to get a wrench to fit over this and make it tight while the laminations are under hydraulic pressure. The foregoing refers to work done by the main shop.

With the use of solidified oil and waste as a lubricant, we have determined that the motors will safely operate 1,400 car-miles, so we have set that period for operating between car inspections. We make a daylight inspection as follows: One gill of solidified oil mixed carefully with the waste is added to a bearing. Very little new waste is added and the oiler uses his own judgment as to the amount to use. Any new waste added is placed next to the bearing. Brushes are removed from brush holders and wiped off and the brush holder springs are tested. Brush yokes are tested for loose brackets and splits. Special attention is given to the proper spacing of brushes between brush holders and to lining up the brushes properly with the commutator. The commutator slots are cleaned and brushed out with a fine wire brush.

The outer mica ring of the commutator is cleaned off and is painted with shellac and oxide of iron paint, when necessary. The armature bearings are inspected for wear in the housings. A feeler is passed between the fields and the armature for a test of clearance. Field coils are inspected to see if they are clamped tight.

The general overhauling of the motor is most important. This we do on a 70,000-mile basis and in a thorough manner. The motor is dismantled from the truck and is taken by a crane to the motor overhauling depart-

ment. There the motor is opened up, the armature is taken to armature room, fields are tested for short circuits and then they are removed from the core and inspected. All field jumpers and leads are sleeved with brass sleeves and are put in condition for another run of 70,000 miles. Mechanics highly skilled in assembling motors are a wonderful asset, and it is to them that a great deal of our success is due. In bolting the field piece to the motor frame we are very careful to see that they come together tightly without air gap.

As some railway properties are able to buy modern motors and scrap the GE-1,000 type, we have been able to pick up the GE-1,000 motors complete for less than the new value of the field coils in them. In dismantling these old motors we have learned why the different properties were unable to run them with satisfaction and we will gamble that if the new motors are allowed to go by default the same way that these motors have, within six years they will be giving as much or more trouble than the GE-1,000. For instance, we purchased some motors and found the throw of the leads of the armatures was wrong. They would run one way O.K. but would blow when operating in the reverse direction. Another road scrapped a number of them on account of high maintenance cost and frequent pull-ins. We found the field coils too thick, not allowing the pole pieces to come in contact with the frame, thus causing an air gap and spoiling the magnetic field.

The month of January, 1922, was very rainy; in fact, it was the worst month we have had for years. The number of cars equipped with GE-1,000 motors turned in for motor trouble was forty-seven, booked as follows: Thirty-six for armature trouble, six for field trouble and five for brush holders. The mileage made by cars equipped with GE-1,000s for the month was 639,464 or 13,600 car-miles per turn-in for motor trouble. We have interpole motors operating on our system that were purchased eight and ten years ago. These operate with less weight of car per rated horsepower than the GE-1,000, and as regards economical maintenance they have but little margin on the GE-1,000. They are, however, more satisfactory from the operating standpoint inasmuch as they will stand much faster feeding of the controller. In the last twenty years the manufacturers have made us good motors, but we, who operate them, have not always given them a fair chance to make good, and many have gone to the junk pile that if properly operated and maintained would have lasted for years.



A CORNER OF THE ARMATURE ROOM. DIPPING TANK AT RIGHT WITH ARMATURE IN PLACE



ASSEMBLING MOTOR PARTS IN SHOPS OF THE MARKET STREET RAILWAY



NEW YORK & HARLEM STORAGE YARD AND ADMINISTRATION AND SHOP BUILDING, LOCATED AT 135TH STREET AND MADISON AVENUE, NEW YORK CITY. OUTDOOR TRANSFER TABLE IN FOREGROUND, SHOP BUILDING IN BACKGROUND

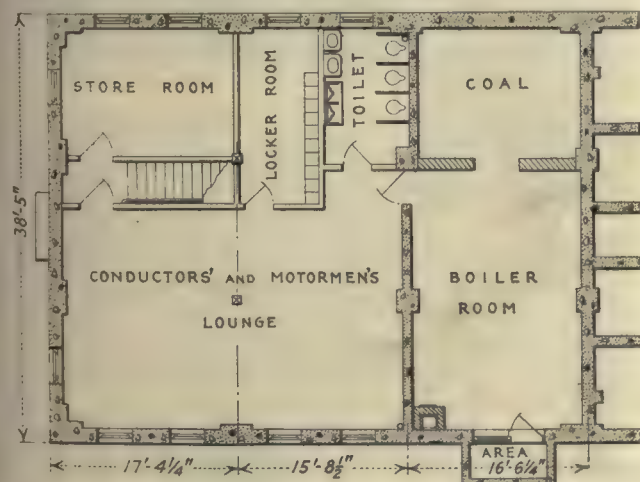
New Maintenance Facilities for New York & Harlem Traction Lines

Former Part of New York (N. Y.) Railways, Operated Independently Since Feb. 1, 1920, Has New Maintenance Shop and Administration Building and Unique Storage Yard at 135th Street and Madison Avenue

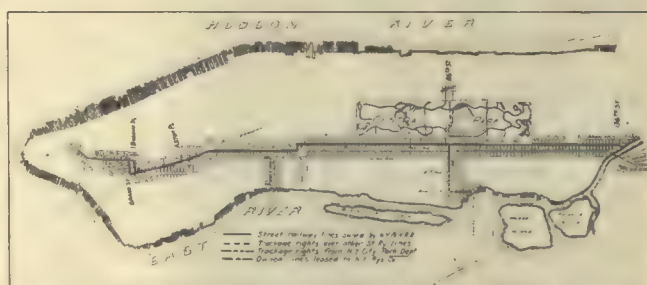
ON FEB. 1, 1920, the 999-year lease of the Fourth and Madison Avenues and the Eighty-sixth Street Crosstown Lines in New York City to the New York Railways was terminated. The latter simply could not pay the rent.* When the owners took over the property they were illly equipped to operate it, as the maintenance work and general administration had been completely merged with that of the lessees. However, by drafting several members of the staff of the New York State Railways, controlled by the same financial interests, the management was able promptly to adjust itself to the new conditions. Temporary storage and maintenance arrangements were made with the former lessees and others, but as rapidly as possible the New York & Harlem provided for complete independence.

The first step was to provide for repair-shop quarters,

*For details of the return of the properties to the owners see the issue of this paper for Feb. 7, 1920, page 305.

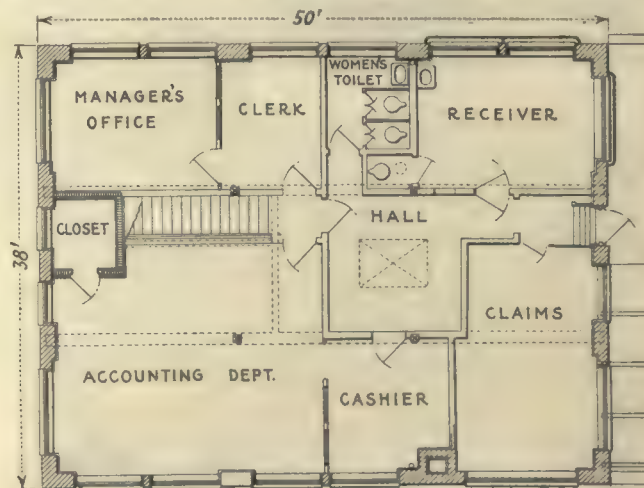


BASEMENT PLAN OF OFFICE BUILDING



OUTLINE MAP OF NEW YORK & HARLEM TRACTION LINES

which was done by renting space in the carhouse of the Second Avenue Railroad at 1874 Second Avenue. Plans were also laid for abandoning the carhouse and temporary headquarters on Fourth Avenue at Thirty-second Street, for which satisfactory rental terms could not be obtained. A piece of property owned by the com-



SECOND-FLOOR PLAN, OFFICE BUILDING

New York & Harlem Traction Lines Have Up-to-Date Operating Headquarters



No. 1—Madison Avenue front of property, with inbound and outbound tracks.

No. 2—Corner of building showing 135th Street façade.

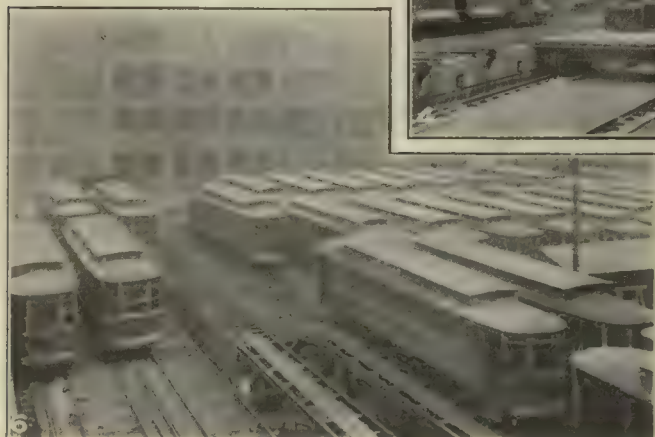
No. 3—Armature rack with bale for handling armatures by means of crane.

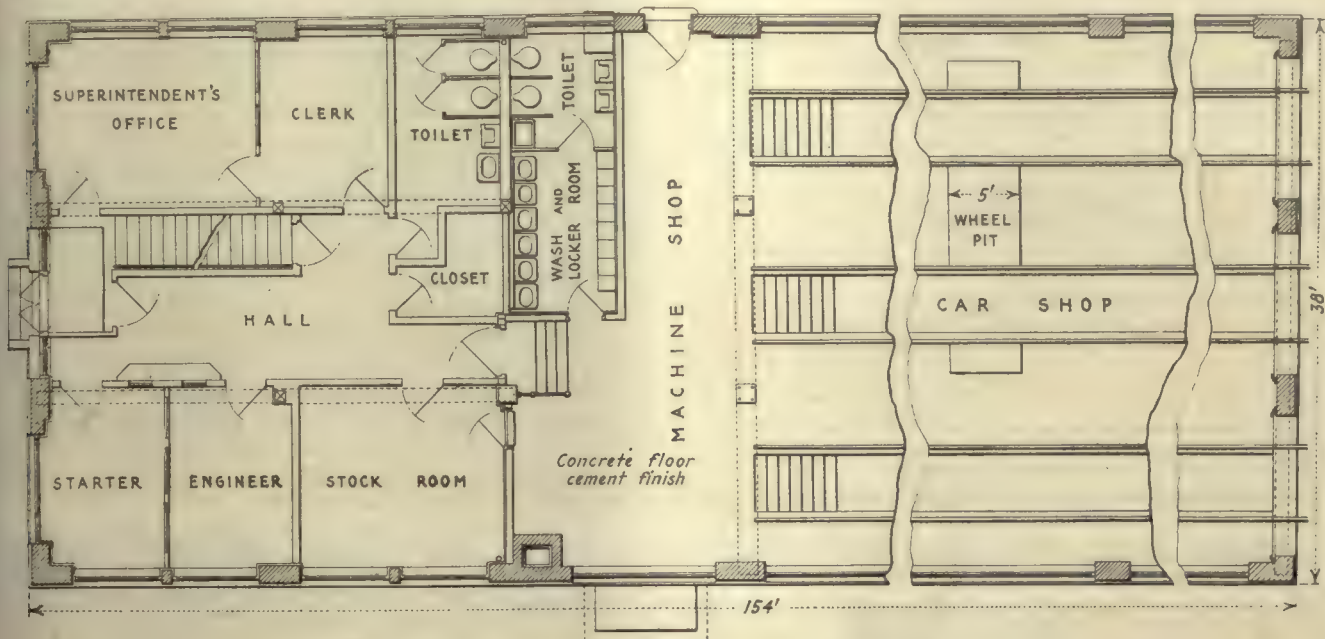
No. 4—Transfer table used for shifting cars in yard.

No. 5—Overhead trolley bars and trolleys for supplying electric power and light.

No. 6—Another view in the yard showing outdoor pits in foreground.

No. 7—View of yard entrance and building from rear.





GENERAL PLAN OF FIRST FLOOR OF CAR SHOP AND OFFICE BUILDING

pany at 135th Street and Madison Avenue was laid out as the site for an open car-storage yard and a general administration and auxiliary maintenance shop building. This work is now complete and its salient features are covered in the present article. Construction work was begun July 1, 1921, and completed Nov. 1. The heavy maintenance work will continue to be done at the main shops mentioned above. These will be taken up at an early date in this paper.

ENGINEERING CONSIDERATIONS INVOLVED IN THIS JOB

The specifications which confronted the engineers in commencing the design of this layout were principally as follows:

1. A site of limited area and irregular form and bounded in part by the property of other owners was to be utilized to provide: (a) Storage space to accom-

modate the maximum possible number of cars; (b) a building of dimensions ample for general offices and a shop for light repairs and inspection, and (c) facilities for spotting cars into and out of storage and inspecting them in the yard without the use of the usual ladder tracks, for which no space was available.

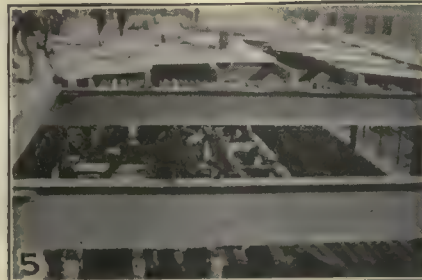
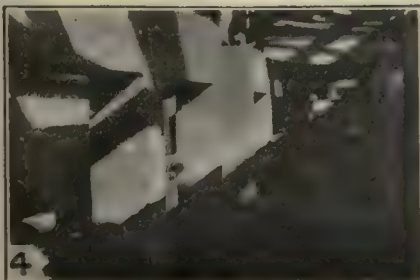
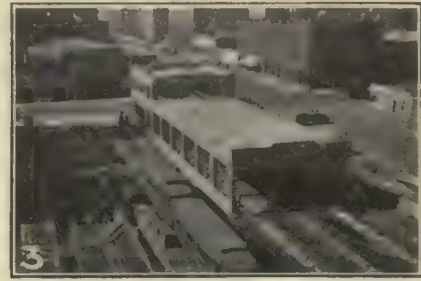
2. The complication of conduit and slot construction had to be reduced to a minimum in order to save cost and facilitate upkeep.

3. Provision had to be made for preventing tidewater from getting into the plumbing, the elevation of the site being low with respect to the high-tide water level.

4. Costs had to be kept down to the limit.

How these four specifications were met is explained in outline as follows:

The site consists of a rectangular southeast corner plot lying approximately 310 ft. along 135th Street and



CONSTRUCTION VIEWS OF ADMINISTRATION AND SHOP BUILDING AND YARD TRACKS, NEW YORK & HARLEM TRACTION LINES

No. 1—Pits in shop are provided by means of concrete beams and columns.

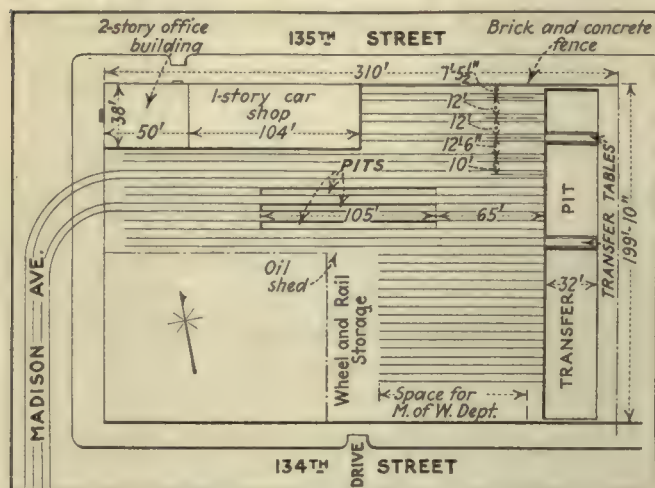
No. 2—Yard tracks are laid on concrete troughs.

No. 3—Liberal window space is provided in shop on north and south sides.

No. 4—Tracks over pits in shop are substantially supported.

No. 5—Shop roof is of mill type construction, supported on heavy I-beams.

No. 6—Even simplified conduit-track construction involves expensive supporting structure.



GENERAL PLAN OF NEW YORK & HARLEM RAILROAD PROPERTY, 135TH STREET AND MADISON AVENUE, NEW YORK CITY, SHOWING GENERAL OFFICE AND CAR SHOP BUILDING AND STORAGE AND INSPECTION CAR YARD

200 ft. wide at the rear. The frontage on Madison Avenue is 100 ft., a 100-ft. x 135-ft. plot on this front being owned by others. A space 38 ft. x 154 ft. was set aside for the building and the remaining space was laid out in tracks, transfer-table pit and materials storage areas.

The most capacious and economical track layout worked out was that shown in an accompanying illustration, with straight tracks and a transfer pit at the rear. This not only involved a minimum of special trackwork, especially desirable with slot construction, but at the same time it permitted the maximum of useful storage track.

The incoming main track and the adjoining two tracks were provided with pits more than 100 ft. long to permit routine inspection and obviate the transfer of cars to the shop tracks for trifling ailments. The main tracks were connected with those on Madison Avenue by means of A. E. R. A. standard spirals, so that standard turn-outs can be installed in the street later if it is desired to connect up the company's tracks with the present tracks on Madison Avenue above 135th Street.

The transfer pit is similar in construction to that used elsewhere in New York City, but being in the open it had to be provided with ample drains through which

snow can be flushed away. In these drains, as in the plumbing drains throughout, check valves were installed to keep out back water.

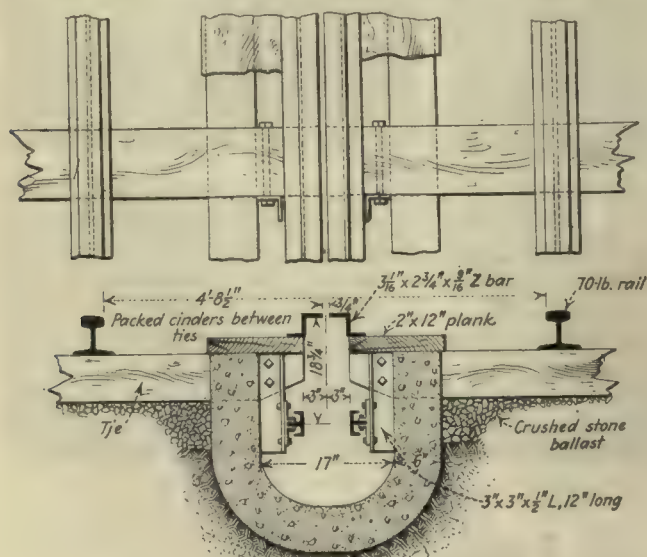
The really novel feature of this layout is the radical departure from usual practice made in the design of slot and conduit construction. While conduit railways in this country are confined to New York City and Washington, D. C., engineers will be interested in this detail as the solution of a complicated problem. It will be remembered that the main track rails and slot rails in this type of construction are mounted on heavy cast-iron yokes which are firmly supported on concrete. The contact bars are in turn mounted on insulators carried by the slot rails. A concrete conduit oval in form is molded to conform to the contour of the opening in the center of the yoke. Obviously such construction would be expensive and complicated in this crowded yard. Here is how its use was avoided:

Concrete troughs were constructed in the center of each track to take and protect the contact rails. The ends of the ties which extend across the devil strip and nearly half way across the gage were imbedded in these troughs. The spaces between the troughs were filled with crushed stone ballast, which assists in supporting the ties.

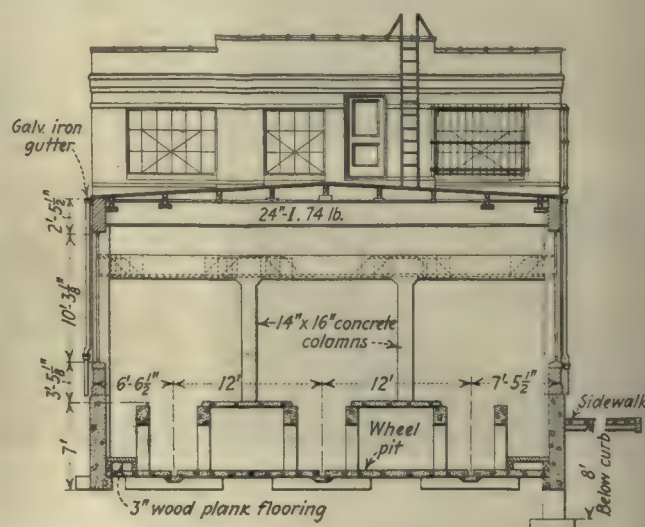
From alternate tie ends, extended for the purpose, the contact rails were supported by standard barn-type trolley hangers bolted to angle-iron brackets. Planks were spiked to the ties to protect the contact rails and support Z-bars which were spiked to them to form the slot. Some modifications in the construction were necessary on outside tracks and at the pits, as will be seen from the illustrations.

SIMPLICITY A FEATURE OF SHOP AND OFFICE BUILDING

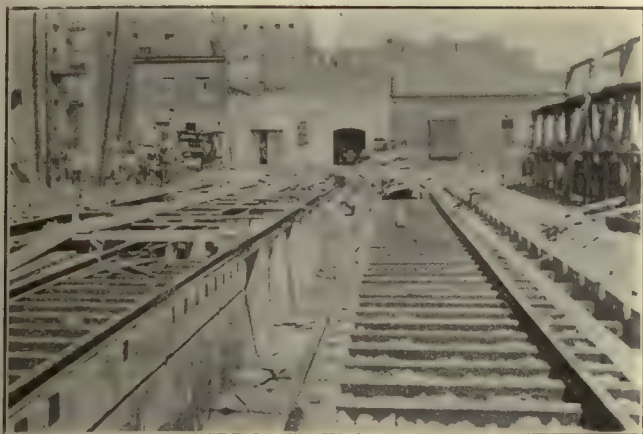
Coming now to the building, it will be noted from the illustrations that it is of mill construction. This was used to avoid brickwork and to utilize standard sizes of steel sash. The main floor is on two levels, the front building being set high to minimize excavation and provide good light for the basement. The details of the building floor layouts are given in the line drawings reproduced, and need not be elaborated here. Suffice it to say that the layout has proved to be just what the management needed for administrative work, and the



DETAILS OF CONDUIT CONSTRUCTION IN SHOP AND YARD.
CONTACT RAILS SUPPORTED FROM TIES



CROSS-SECTION OF CAR SHOP, SHOWING BUILDING AND CERTAIN
CONSTRUCTION DETAILS



VIEW IN YARD SHOWING CONSTRUCTION FOR SUPPORTING TRACK AND PROVIDING CONTACT-RAIL SUPPORT

manager can overlook, from the second floor, the operation of the cars in street and yard.

In the shop there are the standard facilities for changing wheels, armatures, etc. A photograph has been reproduced to show the method used for handling and storing armatures. Another shows a four-wheel trolley which is used for power supply to the cars in the shop. It is made of ordinary trolley wheels carried on a light frame, and rolls on angle-bars hung on barn-type insulators from crossarms. These bars also serve as a source of power for lights, etc., the simple two-wheel trolley shown in the illustration being used as the contact device for this purpose.

One end of the shop space is reserved as a machine shop, where simple tools such as drill press, emery wheel, etc., are provided. One-half of the floor space is occupied by pits under the three tracks. The pit construction consists of heavy concrete longitudinal beams cast solid with the columns.

The work was done under the general direction of H. L. Pitner, engineer of way and structure, with the co-operation of J. F. Uffert and W. B. Uffert of the equipment department. James Stewart & Company were the contractors for the building.

A Handy and Effective Welding Shield

FOR a welding shield to protect pedestrians from the glare of the electric welding arc, the Milwaukee Electric Railway & Light Company has devised an ingenious box to displace the more common fence-type shield. This box shield is made of $\frac{3}{4}$ -in. asbestos board and is about 8 in. wide by 8 in. deep by 24 in. long with an open bottom and a slot in the top extending the full length along one side. The opening in the top is sufficient to permit a free manipulation of the metal electrode which is inserted through the opening into contact with the point at which it is desired to build up the metal. The box does not cut off the operator



WELDER USING ASBESTOS BOARD BOX AS A SHIELD

from a free circulation of the air as the old type shield does. It is deep enough to prevent the glare of the arc reaching onlookers, and as it is equipped with a handle it is very readily picked up and carried from one welding point to another.

Don't Lose Sight of Money Invested in Maintenance Materials

Shop Forces Accustomed to Seeing Large Quantities of Material in Storage Seldom Realize Its Value and May Become Wasteful and Inefficient in Applying It

SOME of the advantages of a perpetual inventory or stores control are pointed out in a bulletin just issued by the Fabricated Production Department of the Chamber of Commerce of the United States.

When capital, says the bulletin, is in the form of cash it is carefully protected, its receipt and disbursement safeguarded, its custodians held to a strict accounting, but once this capital is converted into materials there is a tendency to become lax, to lose sight of the value of the investment, to husband the capital less diligently, to tolerate practices that are wasteful, inefficient and needlessly expensive.

There is something at fault with business methods when material is purchased far in excess of requirements, when material becomes obsolete before it is needed, when material is not protected or kept accessible for use and when foreman and workmen help themselves without authorized requisitions or when material is consumed without any record for cost purposes.

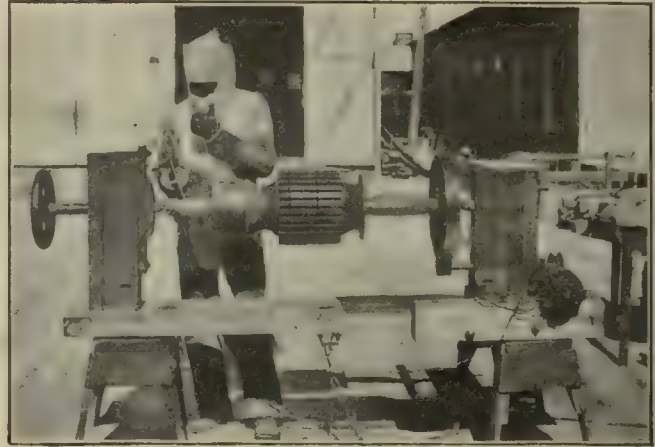
An efficient stores or perpetual inventory system, and that alone, will provide: (1) Sufficient material to meet requirements so that production shall at least not be checked by a lack of necessary material; (2) a minimum investment in inventories which is of supreme importance at the present time; (3) an orderly and accessible arrangement of material and the physical safeguarding of material from the elements and theft; (4) the elimination of the burdensome and inaccurate annual physical inventory; (5) a monthly closing by giving the amount and value of material on hand at any time; (6) an invaluable record in case of fire loss, and (7) a safeguard against the accumulation of obsolescent material.

The control of material does not end with the store-room or its record; to a large degree the success of a stores control system will depend on the co-operation of foremen and workmen. In particular the foreman can directly help the control of materials by avoiding congestion in the departments, by protecting material in the departments against breakages and thefts, by assisting in the proper distribution of material to their men, by seeing that the men get the quantity of material ordered, by ascertaining that material is skilfully handled in the departments and when processed that it is promptly and properly transferred.

The little waste, a nut here, a bolt there, each inconsequential in itself, is serious in the aggregate. The foreman can effectively co-operate by husbanding the consumption of such material, the requirement for which can only be estimated and not always expressed with exactitude. These include supplies such as oil, waste, paint, greases and solder, and fittings and fastenings such as bolts, nuts, screws and rivets.



WELDING RESISTOR GRIDS WITHOUT REMOVAL FROM THE CAR



EARLY EXPERIMENTAL TYPE OF WELDER USED IN SAN ANTONIO

Arc Welding in Railway Shops

Repairs to Rolling Stock Equipment Can Be Frequently Made Without Removal from Cars So that Large Savings in Both Labor and Material Result

BY S. E. MASON

Superintendent of Equipment San Antonio (Tex.) Public Service Company

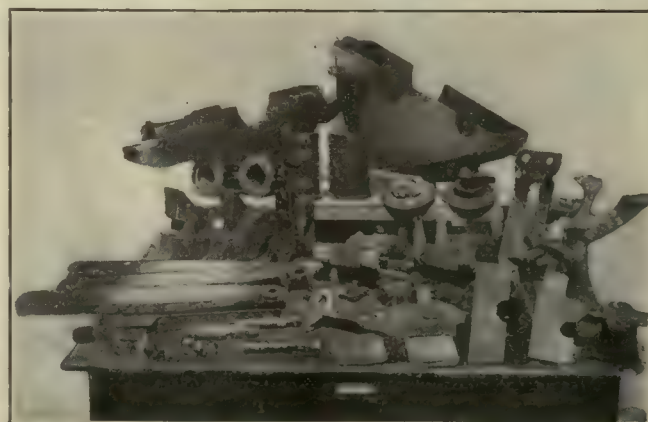
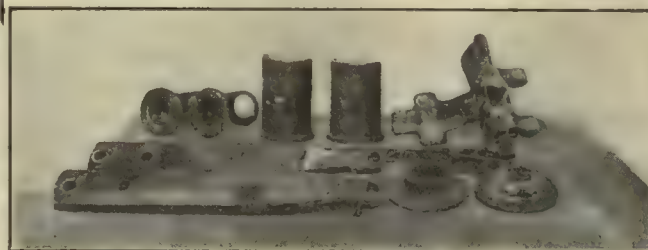
ELECTRIC welding in the shops of the San Antonio Public Service Company began in October, 1918, with a home-made electric welder of the resistance type giving a variation of from 77 to 200 amp. in five steps across the trolley supply, as shown in an accompanying schematic diagram. This machine was superseded by a motor-driven 175-amp. electric arc welding equipment in September, 1920. Since then we have evolved a routine of reclamation of parts of electric car equipment which is showing a handsome return over and above its operating cost and investment charges. This property serves a city of 165,000 population and operates a total of 175 passenger motor cars over 95 miles of track. Of these cars ninety-six have single trucks and the remainder are heavy double-truck cars.

Our records show that by the use of the electric welder we have saved an average of \$1,308.13 a month. This makes an annual saving of \$15,697.58, which we believe is a wonderful return on the investment, as the single-operator unit cost us approximately \$1,000 installed. In other words, the outfit has more than paid for itself every month. I am sure that the actual figures as taken from our records will be of considerable interest to other railway companies. These figures are given in the accompanying tabulation. An explanation of the headings of the columns and

the method of obtaining the various information is necessary to check the correctness of the figures. The "Per Cent Condition After Weld," second column, indicates the per cent of life expected after repairs by electric welding, the life of a new article being considered 100 per cent. It will be noted that in some instances the per cent condition after welding is above 100. The explanation is, for instance, in the case of clevises and pull rods, that the method of welding adds qualifications not found in the original article, due to the introduction of a small per cent of carbon into the molten weld, thereby case-hardening and resulting in a longer life than could be expected from a new part.

The welder's time in making the weld (column 3), the machinist's time in machining the weld (column 4), and the materials used (pounds of welding iron, column 5) combine to give the total cost of reclamation (column 6), neglecting current and overhead. Column 7 shows the cost of the new part. The saving indicated in column 8 is found by taking into consideration the per cent condition after welding. The number of parts repaired per average month (column 9) multiplied by the saving on each part shows the saving per month (column 10).

A large saving of \$207.48 is credited to "changing core" and "per cent winding saved" in labor and material. It is interesting to



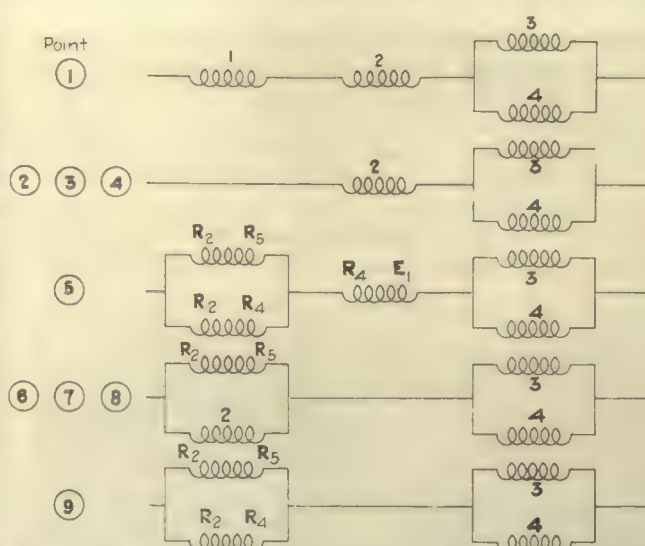
SAMPLES OF REPAIR BY ELECTRIC WELDING

These groups of articles repaired by electric welding represent five different classes of metals.

note how this is accomplished. In welding worn journals or armature shafts we remove the complete armature and place it in a lathe. The metal electrode is then placed in a position corresponding to the tool chuck and the armature is revolved. The electrode deposits the necessary metal on the shaft very evenly in spiral form. After the metal is deposited, the electrode is removed, a tool is inserted and the shaft journal bearing is machined to the proper diameter. This eliminates the necessity of removing the core or winding from the shaft and therefore is properly credited to the saving in welding. This method of spiral application was evolved after we experienced trouble with warping of shafts when placing metal back and forth parallel to its length. It also makes a much smoother finish as it is comparable to machine welding.

The machine shown in the illustration with the welder building up the armature shaft is one we used in the earlier experimental stage, and although it has considerable merit, it is limited in its possibilities. The present machine is located in a narrow space and is inaccessible for photographing. This new machine has a shop-made lathe especially adapted. Another illustration shows a close-up of a spiral weld on an armature shaft.

We recently had an accident with a 10,000-kva. turbine due to the dropping of the spindle which cracked the lower half casting of the front turbine bearing. This was readily welded by bringing in the electric arc welder from the carhouse. Because of the small tolerance between the moving and stationary blades, other methods of welding would have undoubtedly



SCHEMATIC DIAGRAM OF CONNECTIONS FOR EARLY RESISTANCE TYPE ELECTRIC WELDER

Point	Volts	Ohms Resistance	Amperes
1	525	6.780	77
2-3-4	525	4.068	129
5	525	3.842	136
6-7-8	525	2.917	180
9	525	2.625	200

caused warping to such an extent as to be inadaptably; further, preheating necessary to other welding methods would have been practically impossible.

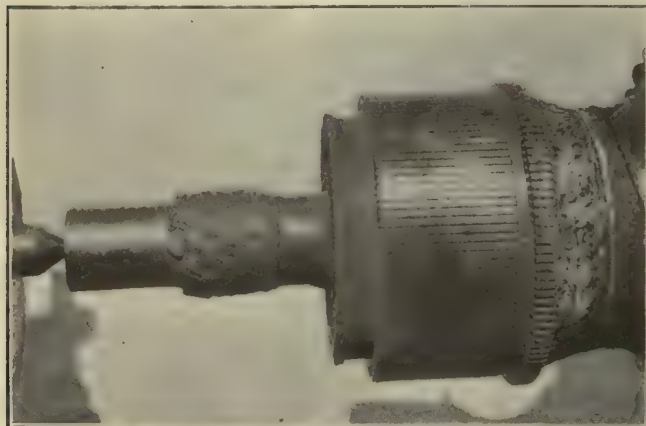
The illustration of a welder repairing a broken grid without disturbing the resistor demonstrates how repairs may be made on broken parts without removing them from the car. In this case cost of labor to remove,

Article reclaimed	Per Cent Condition After Weld	Welder's Time, Hours	Machinist's Time, Hours	Material, Pounds	Total Cost	Cost New	Saving	No. Used per Month	Saving per Month
Worn gear and wheel seats on axle.....	80	6	4	5	\$9.75	\$27.52	\$10.02	2	\$20.04
Worn journals on armature shaft.....	95	5	4	4	8.42	17.50	8.21	6	49.26
Changing core, etc.....	100					3.43	3.43	6	20.58
Per cent winding saved.....	80					119.20			
Brake shoe heads No. 136666 caps.....	80	2	2	3	4.11	5.45	1.35	6	186.90
Swivel for trolley base.....	90	1 1/2	1 1/2	1	1.94	9.66	6.75	2	13.50
No. 119763 pole socket body for trolley base.....	90	3	1	1	3.66	7.44	3.04	1	3.04
Swing link bottoms.....	90			1 1/2	0.54	1.22	0.56	5	2.80
Clevises and pull rods.....	110			1	0.65	5.00	4.85	1 1/2	7.28
Worn key way in armature shaft pin seat.....	85		3	1	3.44	17.50	14.88	2	29.76
Thrust 512-A armatures.....	80			1	1.67	4.09	1.60	3	4.80
Thrust 200 armatures.....	80			1	1.67	5.40	2.65	2	5.60
512-A thrust rings.....	95			1	0.86	2.11	1.14	10	11.40
GE-54 thrust collars.....	95			1	0.86	5.11	3.99	15	59.85
K-28 check pawls.....	80				0.43	0.59	0.04	2	0.08
27-G1 side bearings.....	100	1			1.50	3.09	1.59	5	7.95
GE-54 dope cuplids.....	90				0.43	0.13	0.31	4	1.24
M-33 door castings.....	90				0.86	1.54	0.53	1	0.53
1171-F door castings.....	90				0.43	1.45	0.88	3	2.64
4767 door castings.....	90				0.43	1.68	1.08	1	1.08
1106-M door castings.....	95				0.64	5.19	4.29	3	12.87
Step casting levers.....	85				0.29	0.76	0.36	12	4.32
Draw bar carriers.....	90				0.43	2.36	1.69	1	1.69
Space block for equalizing spring.....	80				0.64	3.85	2.44	8	19.52
4387 brake head shoe bases.....	100			3	1.32	3.86	2.54	1	2.54
Light load coil spring seat.....	80			1	0.65	2.43	1.29	1	0.32
AS-956 seat arms.....	95				0.29	0.62	0.30	1	0.30
AS-962 seat ends.....	100				0.65	0.80	0.15	1	0.15
Seat supports.....	100				0.43	0.67	0.24	1	0.24
Dowel pin holes in axle bearings.....	85			1	0.98	9.13	7.76	6	46.56
Hinge on gear case lids.....	95				0.43	0.75	0.29	3	0.87
Lug on trolley catchers.....	80			1	0.49	1.54	0.74	1	0.74
K-12 controller cap.....	80			1	0.91	4.69	2.84	1	2.84
K-12 controller frame.....	80	3		1	3.58	25.00	16.42	1	4.10
GE-54 armature bearing dust covers.....	110				5.68	5.54	0.41	40	16.40
Bore of 512 axle gear.....	50	4	4	3	7.55	31.69	8.30	1 1/2	0.69
Brake bearing caps, dowel pins, 92-A-512-A GE-200.....	85				0.93	6.62	4.70	3	14.10
Patch gear case halves 54-92-A-512-200.....	75	1			1.11	18.62	12.85	45	578.25
Journal boxes.....	95	1		1	1.86	9.00	7.69	1	7.69
Air valve stems.....	100	1		1	1.59	4.20	2.61	15	39.15
Enlarged hinge pin holes in brushholders.....	80				0.43	5.34	3.84	10	38.40
GE-54 top motor case.....	95	5		2	4.74	49.31	42.10	1	21.05
Build up armature core key.....	50		1	1	1.59	52.69	24.75	1	24.75
Build up commutator shell seat.....	50	2	2	1	3.55	17.50	5.20	1	5.20
Weld loose farebox brackets.....	95				0.21	0.86	0.61	10	6.10
Drill shanks (average 1).....	50				0.43	1.47	0.30	6	1.80
Broken truck braces.....	90	3		25	4.05	4.37	10.30	1	10.30
Resistance grids.....	100	1/12			0.07	0.51	0.44	7	3.08
Air reservoir.....	100				1.83	13.23	11.40	1	2.85
Standard brake shoe heads.....	75	1			0.97	2.44	1.47	6	13.23

\$1,308.13

dismantle and reassemble the resistor is much higher than the material costs. The method used not only saves in material costs but the major portion of labor costs is saved as well. A few of the typical reclamations of parts worn, welded and machined are shown in two other illustrations. Five different classes of metals are shown in these groups.

Each method of welding assuredly has its particular field and the success of the finished job depends upon



A SPIRAL WELD ON AN ARMATURE SHAFT

the judgment of the welding engineer as to whether the thermit, electric or oxyacetylene process should be used. However, there is no type of welding that has as wide a range as the electric, which can be adapted to almost any job, irrespective of size or metals, and as for speed, costs and quality of finish, it is without an equal.

Maintenance Kinks from Little Rock

W. H. CURTIS, master mechanic Little Rock Railway & Electric Company, has rigged up a number of ingenious devices which help the repair work done in the shops of that company. One of these is an air brake valve grinder. Formerly these valves were ground by hand and the process took about an hour and a half. Now they are ground by electric power in about thirty minutes and the machine requires no attention while the valve is being ground. The valves to be ground are bolted to the vertical side of the work bench, and the grinder, which is of the kind used for grinding automobile valves with a rotary motion but with reversing movement, is set in an adjustable frame over the valves to be ground. The grinding machine is then driven by a small electric motor through a wooden pulley and belt.

Another adaptation of electric drive to work formerly done by hand is the winding of resistances for type E air governors. In this case an old sewing machine frame is used for the frame of the winding machine. It is driven by a former fan motor which is belted to the shaft of this improvised winding lathe. A resistance spool can now be wound in ten minutes instead of in an hour and a half. The fact that the shops are equipped with 110 volts permits the use of the fan motor without resistance.

Like many other shops in the country, those at Little Rock make extensive use of electric welding in repair work. During a recent visit to the shop by a representative of this paper, Mr. Curtis pointed out a pile of brake shoe heads whose center and end seats had been built up by arc welding. The practice results in a sav-

ing of about \$1.50 per brake shoe head over a new head or a saving of about \$350 a year, as 200 new heads otherwise would have to be purchased.

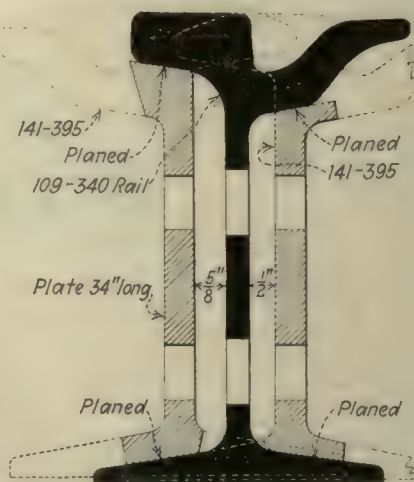
Some time ago the company changed over the method of armature shaft and motor journal bearing lubrication of some of its G.E.-57 motors so as to decrease the amount of oil used and increase the period between oilings. The plan followed was simply to increase the size of the oil wells by welding on top of the well a section about 4½ in. long of square shaped boiler tube about 3 x 3 in. The tops of these enlarged oil wells are then fitted with the usual spring cap. This method was described in the *ELECTRIC RAILWAY JOURNAL* for May 7, 1921, page 861, and now the motors on ten cars have been fitted in this way. The oil well is packed with waste and its enlarged capacity for oil enables a car to run for ten days or 1,000 miles without reoiling. Then less than a gill is required per bearing.

The company is still using sheet metal ceilings in its cars and finds them cheaper in first cost and maintenance than veneer, the material formerly used.

Worn-Out Rails Cut Down to Make Joint Plates

THE Market Street Railway, San Francisco, has recently made up about 100 pairs of joint plates from worn girder rail that had been taken out of service to be scrapped. By a comparison of cross-sections it was found that joint plates suitable for 109-340 (Lorain) rails could be cut from the 141-395 (Lorain) rails that had been worn out on this system.

The shaded sections on the accompanying illustration represent the portions of the old rails utilized and the solid section represents the 109-340 rail on which they are used. Each plate consists chiefly of the web from the worn rail from which parts of the base, ball and lip have been cut away with the oxyacetylene torch. Four oxyacetylene cuts are required, two on the head and two on the base, to make each plate. With the piece



SECTIONS SHOWING HOW PARTS OF SCRAP RAIL ARE USED FOR JOINT PLATES

roughly cut out in this way, two surfaces on each plate are planed to insure exact size and smooth fit against base and ball of rail respectively. The bolt holes in the web are then drilled in the usual way.

This method has been found to provide joint plates of very good quality at low cost. The plan was worked out by W. D. Chamberlain, assistant chief engineer Market Street Railway.

Installing Shallow-Conduit Construction in Washington

The Capital Traction Company Uses a Large Number of Pneumatic Tools in Replacing the Old Type of Deep Tube Cable Construction with New Shallow Tubes

BY D. E. DUNN

Ingersoll-Rand Company, New York, N. Y.



TRAFFIC CONTINUES THROUGHOUT THE OPERATION

MOST electric railway men are more or less familiar with the underground conduit track construction used in Washington, D. C. But probably very few, except those who have actually worked on this type of construction, realize the difficulties of excavation on renewal work of this kind without interfering with car operation.

The Capital Traction Company of Washington, D. C., has been very busy the past few years renewing completely the old deep tube cable road construction which was installed in 1891-1892. As its name implies, it was a cable road, so operated until 1898. During 1898-1899 the entire system was electrified, the conductor bars being placed in the same tube that was used for cable operation.

In 1901 several extensions were built and a shallow tube construction adopted as standard. This type has a yoke spacing of 5 ft., which did not allow of its being used for renewal of cable construction. The result was that a new type of shallow tube construction was designed with a yoke spacing of 4 ft. 6 in., which has since been used for complete renewal of the old deep tube cable work.

The old tube concrete was a 1-2-4 mixture, using 1-1½-in. crushed stone as aggregate. Needless to say, it was, and still is, hard concrete. Even after the twenty or more years since it was installed and subjected to heavy car traffic day after day it is still in first-class condition. During excavation work it is a common sight to see the stone itself split rather than the bond give way.

Prior to 1917 all excavation work was done by hand, using a 1½-in. round steel to a depth of a few inches and then splitting off the concrete with 3 in. square bull-points. There was not a great deal of renewal work in those days, and labor was cheap, so that method answered very well.

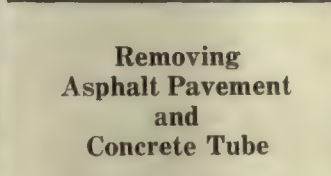
However, in 1917 the company purchased its first portable air compressor, an Ingersoll-Rand Imperial XII machine and two "jackhamer drills." These tools did excellent work, so the following year two tie tampers were purchased, not, however, to tamp ballast, but to be used with chisel bits for cutting out the asphalt pavement, trimming out yoke holes, etc.

In 1919 an outside contractor rebuilt some track and brought with him a home-made portable compressor, consisting of four car compressors and four tanks, mounted on a low-wheeled truck. The Capital Traction Company purchased two more "jackhamer drills" for that job, taking them over when the contractor had completed his work. He, of course, took his compressor back with him, so the railway then had on hand several more tools than it had air equipment to operate them.

In 1920 the railway built two compressors similar to the one the contractor had, and then purchased three more tie tampers. These additional compressors and tools proved very satisfactory, so in 1921 another compressor was purchased. This was a Westinghouse Traction Brake Company's type E-4 machine, and to date eight Ingersoll-Rand type CC-25 concrete breakers and two Little David sand rammers have been added to the equipment.

The first two of the concrete breakers were received on March 28, and they proved so satisfactory that the "jackhamer drills" and tampers were gradually replaced with the CC-25's. These tools are just what their name implies—concrete breakers, in every sense. One wonders, while watching them in use, how people ever got along without them in the years past, particularly in excavation work such as is necessary in Washington.

The first complete rebuilding job of any extent was Pennsylvania Avenue from Second Street to Seventh Street, Northwest, in 1912. The following year Pennsylvania Avenue was rebuilt from Ninth Street to Fif-



Removing Asphalt Pavement and Concrete Tube

No. 1—First stage of reconstruction after asphalt is removed.
No. 2—Operators loosening and breaking up concrete tube.
No. 3—Cutting away asphalt with tie tamper.
No. 4—Removing concrete by the hand method. Gang consists of three strikers and one chisel holder.

No. 5—Working in close quarters with a pneumatic tool. The wooden paddles shown are used to safeguard the worker, so as to make certain that the tool does not come in contact with any live parts of the conductor bars. In operation one workman holds the paddle between the conductor bars and the tool.

teenth Street, Northwest. Costs per foot of track were carefully watched and compared from day to day, and it was thought at the time that these jobs were very economically completed, and, until about 1916, they were used as a basis for comparison on complete rebuilding jobs.

But owing to varying wage scales, a fair comparison was hard to obtain without a great deal of work, as the only way to obtain the actual man-hours expended was by going through all the time books and picking out the labor on each phase of the work. Even this would not have been very accurate.

In 1919, however, this company instituted a new system of cost keeping, which is all that could be wished for. Not only are the actual costs kept on every phase of the work, but also the labor-hours, foremen and laborers being separated. Thus, no matter what the wage scale, a comparison of labor-hours per foot of track is always available, and this is really what is wanted. The railway officials now speak of a job as requiring so many labor-hours per foot more or less (usually less)

than the preceding job, instead of costing so much more or less.

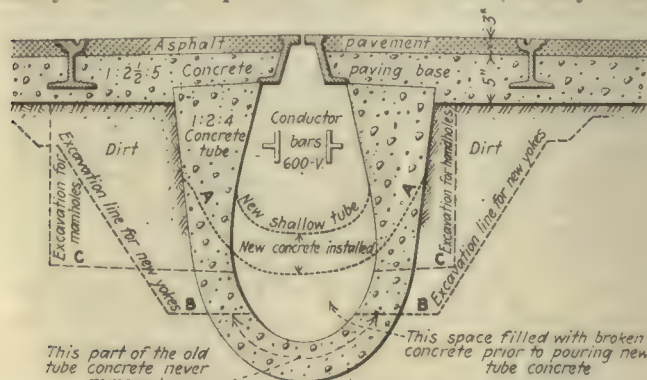
By digging through many old-time books, a fair average hourly wage for the excavation gang during the years 1912-13-16-17 and 1918 has been obtained and, knowing the cost per foot of track of excavation on the various jobs, the approximate labor-hours per foot have been computed.

The accompanying table gives such data and also the number of air tools available at the time the various jobs were under way. These figures are for excavation only, and do not include any costs of hauling excavated material away from the jobs:

LABOR COSTS AND HOURS PER FOOT OF SINGLE TRACK FOR EXCAVATION ONLY, AND AIR TOOLS AVAILABLE AT THE TIME

(Figures include excavating through paving base on one-half the dummy)

Year	Per Ft. Cost	Single Track Hours	Air Tools Available for use
1912	\$1.81	10.45	None
1913	1.56	9.12	None
1916	1.33	7.10	None
1917	1.62	7.08	Two "jackhammer drills"—50 per cent of the time
1918	2.47	7.49	Two "jackhammer drills"—Two tie tampers
1919	3.30	8.08	Two "jackhammer drills"—Two tie tampers
1920	3.49	7.78	Four "jackhammer drills"—Six tie tampers
1921	1.70	4.46	Two to six concrete breakers—Two tie tampers



AA=Excavation line for new tube construction between new yokes
BB=" " " " installing new yokes, 4'-6" C to C
CC=" " " " insulator boxes, 15'-9" C to C

CROSS-SECTION OF TUBE CONSTRUCTION, SHOWING EXCAVATION NECESSARY FOR RENEWAL WORK

Figures don't lie; therefore, according to the foregoing table, air tools did not effect any saving until this year. But, stop to consider the quality of available labor during the war, the heavy increase in car traffic, and numerous other conditions that made this sort of work much more difficult, and then wonder that the labor-hours did not almost double.

This year, however, labor has improved in quality, and certainly in quantity, and the CC-25 concrete breakers made their debut; the result is a decrease of about 40 per cent in the cost of excavation on this work.

So far, the discussion has been confined to straight trackwork. Needless to say, pneumatic tools are even



Replacing Rails and Loosening Earth for New Construction



No. 6—Machine method facilitates chipping off boltheads.
No. 7—Hand method of chipping off boltheads previously used.
No. 8—Special tongs used to lift large chunks of concrete after they are broken off by the paving breaker.

No. 9—Tie tamper equipped with spade point loosening compact earth.
No. 10—Hand method of loosening dirt which has been replaced by machine methods.

of greater value in excavating for special trackwork renewals, where the concrete is much heavier and much more difficult to remove.

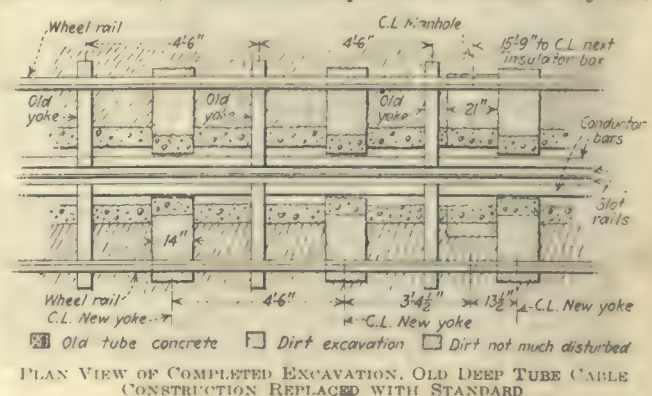
Several small tools, such as scoop-shaped hoes, tongs for large lumps of concrete, etc., which are made in the railway company's shops, have also materially aided in removing the broken concrete from the bottom of the tube and have helped to reduce the costs of excavation.

The accompanying illustrations will give a rather complete idea of the extent and nature of the excavation work recently carried out at Fifth and G Streets. By referring to the cross-section of the tube construction, it will be seen that in order to provide for the new shallow tube, it is necessary to remove asphalt pavement, concrete paving base, and a large part of the old concrete tube. In order to provide for manholes and new yokes, it is also necessary to excavate and remove a considerable amount of dirt outside of the concrete tube. In such reconstruction the first work is the removal of the asphalt pavement.

For breaking up the asphalt two air-driven tools were used, first a pneumatic tie tamper, which was later discarded in favor of CC-25 paving breakers. An Ingersoll-Rand 6-in. x 6-in. type 14 portable gasoline-driven compressor outfit will furnish sufficient air to operate two paving breakers working continuously. The crew for such a job consists of three men, one compressor man and two operators. It is usual for the compressor man to be in charge of the crew and he relieves the operators from time to time. In order to confine the removal to definite lines so that there is no waste from removal of material not required, the first operation is what is termed "marking" the asphalt. This operation consists of driving the chisel bit through the entire thickness of asphalt at intervals of about 3 in. to 4 in. along a line which is to mark the extent of the asphalt to be removed. At the point where the removal of asphalt is to commence the end is also marked. The

chisel is then driven nearly vertically through the full thickness of the asphalt and it is then slid along under the asphalt so as to break it up into pieces about 12 in. x 18 in. The asphalt is practically "peeled" off the concrete base by this operation. The broken pieces of asphalt are removed by hand and are piled up out of the way for removal. The paving breakers are rugged, all steel machines, the principal parts being drop forgings, so as to stand severe usage and hard work. The chisel used for marking and breaking up the asphalt pavement has a width at the cutting edge of 3 in.

The next work consists of the removal and breaking up of the concrete paving base, which averages from 5 to 6 in. in thickness. A moil point steel tool is substituted for the chisel in the paving breaker. This is driven through the concrete sub-base at about the middle of the trench. This spalls off an irregular V-shaped piece. Then two or more cuts are made, which remove the remainder of the concrete along the line. Chunks of considerable size are thus broken off, and in order to facilitate the handling of these the Capital Traction Company has made some tools which consist of tongs that will grip the chunks of concrete and which have handles so that the lumps can be handled by two



men. An accompanying illustration shows this process. Also for comparison illustrations are given showing the removal of concrete by the old hand method where a gang of three strikers and a chisel holder were necessary to break off the concrete. The saving to be gained from employing machines over hand methods on similar work in track where there was no conduit slot to contend with is illustrated by the fact that a man with a paving breaker averaged 14 cu.ft. per hour, while with the hand method the rate per man per hour was but 2½ cu.ft.

Following the gang which breaks up and removes the concrete is another which chips off bolt heads and



CLOSE-UP VIEW OF OPERATION OF LOOSENING COMPACTED SOIL WITH SPECIAL SPADE POINTED STEEL TIE TAMPERS

cleans the concrete from the face of the rail. Two men perform this work, one for each rail, and they each operate a 56-H Little David pick. The same compressor which is used for two paving breakers will operate two of these Little David picks. This would seem to overload the compressor, but such is not the case, as all of these tools operate intermittently. The same tools are used to remove the concrete which adheres to the rails. An accompanying illustration shows the old method

of chipping off boltheads by hand. After removing the concrete and in order to provide sufficient excavation for installing new yokes and for manholes and handholes, it is necessary to loosen and remove some dirt. The soil is very compact, and for loosening this old tie tampers equipped with spade-pointed steel tools are used.

After the old yokes are removed from the roadbed new yokes are put in place and concreted in as shown in the accompanying drawing and the street is finally repaved with asphalt. The actual amount of material

excavated varies from 35 to 40 cu.yd. per 100 ft. of single track including one-half the dummy, about 25 cu.yd. of which is concrete. The Capital Traction Company now has about \$10,000 worth of portable compressors and pneumatic tools, and the officials consider this a very profitable investment.

Obsolete Rail Saw Made Over Into Rotary Planer

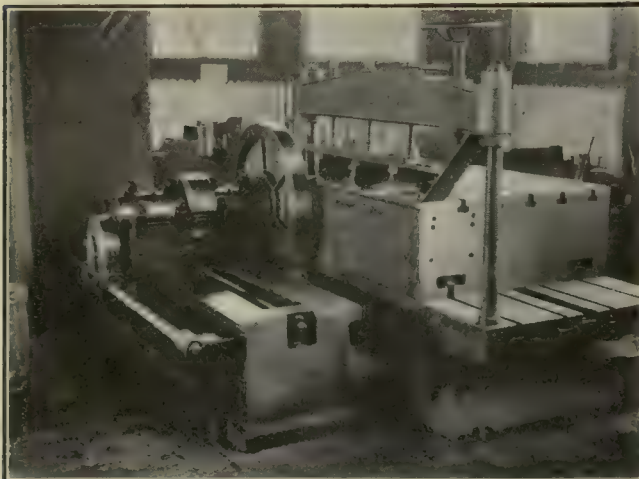
SINCE the advent of the oxyacetylene process a Newton rail saw in the shops of the Market Street Railway, San Francisco, has not been used for the original purpose of cutting special trackwork, etc., and has been classed as obsolete equipment. The device is a power-driven circular saw designed for heavy duty and substantially built. It was found that with a slight modification the machine could be used for planing. It was, therefore, equipped with a new head and has been used to advantage in connection with the recently devised process of making fishplates from scrap rail described on page 448 of this issue.

To adapt the old machine to this new service the circular saw was replaced with a 3-ft. circular head or wheel weighing about 300 lb., around the rim of which thirty cutting tools had been set. These tools, similar to those used on a planer, are set horizontally in holes drilled through the rim of the wheel and project from the wheel on the side away from the driving mechanism. Each cutter is held in place by two set screws, tapped in from the periphery of the wheel.

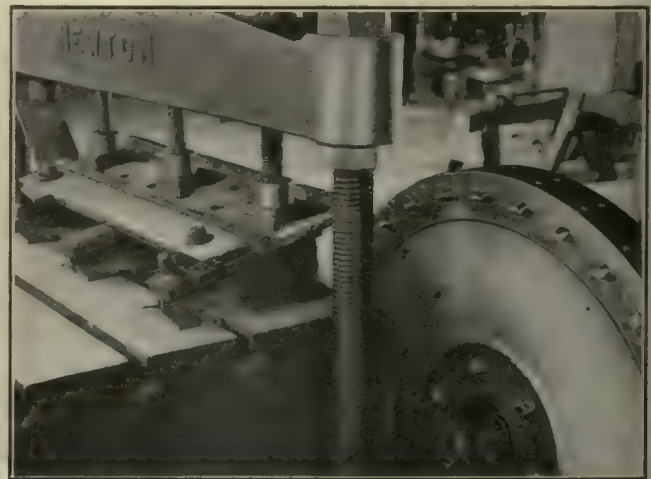
The driving mechanism and the feed are the same as used on the original machine with the exception of the drive pulley, which was changed so as to give a cutting tool speed of 45 ft. per minute. This is the linear speed of the cutting edges, which rotate on a circle 30 in. in diameter, and is the rate found most effective.

The bed plate or table on which the work is fastened is fixed, except for a slight lateral movement, to facilitate adjustment of the work in exact position. The mechanical feeding of the machine into the work is effected by an adjustable friction drive on the driving mechanism and can be varied between the limits of ⅛ and ¼ in. per revolution. The machine is adapted only to cutting plane surfaces. Where beads or fillets are required the work is done on the ordinary planer.

The utilization of the old machine in this way was worked out by William Hendry, superintendent special-work shop, Market Street Railway.



GENERAL VIEW OF ROTARY PLANER, JOINT PLATE ON BED



CLOSE VIEW OF CUTTING HEAD, JOINT PLATE AT LEFT

Specialized Repair Forces Produce Better Track Maintenance

Milwaukee Company Way and Structures Department Has Some Employees Organized Into Gangs Assigned Steadily to Certain Kinds of Work—The Men Become Expert in Their Specialties—Some Maintenance Practices and Equipment Used Are Discussed



WELDERS BUILDING UP TRACK JOINTS. USING 100-AMP. WELDING MACHINE MOUNTED ON RUBBER-TIRED TRAILER

ROADMASTERS of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., are relieved of much specialized repair work incident to the general track maintenance, for the tendency of the way and structures department has been to separate those jobs requiring special experience and tools from the general run of trackwork. Under the ordinary plan it is necessary for the roadmaster and many of his men to be somewhat Jacks of all trades, but by segregating such work as special trackwork repair, grinding, welding and bonding, etc., from the duties of the roadmaster, and assigning these to men who do nothing else, the plan tends to produce better efficiency in all of the work.

Following out this general plan, the company has maintained during the past year, a special trackwork unit, a grinding, electric welding and bonding unit, cast and thermit welding unit, and an equipment maintenance group in addition to the general trackwork forces and the construction forces. Two or three general construction foremen take full charge of all major construction jobs and leave the roadmaster and his forces and the specialized units free all the year around to do the maintenance work.

The special trackwork repair unit consists of a foreman and five or more men who are equipped with an air compressor, various air tools including a hand grinder and air tampers, a full equipment of electric spike hole borers, spike drivers and track drills, acetylene cutting outfit, a dynamotor electric welder, special wrenches, and other tools incident to making special work repairs. The men in this unit are trained for the particular line of work and they operate independently of the general maintenance organization. Working continually at this one line of work, these men become very expert at fixing up worn special work to secure the maximum life before replacement. They also naturally handle this work more expeditiously than men who handle such work

only now and then. Furthermore, it would be obviously impractical to provide the general maintenance gangs with as complete an outfit of tools and equipment.

Another maintenance unit working independently of the roadmaster's forces is engaged throughout the year on the grinding, electric welding and bonding work.

This unit is made up of twenty-two men, who have been picked for their competency in doing any of the work involved in grinding, electric welding and bonding, as these different operations go together much of the time. This unit has six grinders at its disposal, including an Atlas grinder, a Goldschmidt thermit grinder, a reciprocating grinder and a Universal grinder. In construction and reconstruction work, the joints are frequently rough ground

FORM 1110-2-20-20-1000
Location: *Grand Ave.*

CAST WELD JOINT (C)		THERMIT JOINT (T)		ELECTRIC WELD (E)	
(1) Broken Weld	(1) Rail Broken in Joint	(1) Loose Weld	(1) Rail Broken in Joint	(1) Loose Weld	(1) Broken Rail
(2) Rail at Joint	(2) Joint Broken	(2) Rail Broken in Weld	(2) Joint Broken	(2) Rail Broken in Weld	(2) Broken Rail
(3) Rail Loose in Weld	(3) Cupped Joint	(3) Rail Loose in Weld	(3) Rail Loose in Weld	(3) Rail Loose in Weld	(3) Broken Rail
(4) Cupped Joint	(4) Joints Replaced with 2 Solder Joints	(4) Joints Replaced with 2 Solder Joints	(4) Joints Replaced with 2 Solder Joints	(4) Joints Replaced with 2 Solder Joints	(4) Joints Replaced with 2 Solder Joints
(5) Joints Replaced with 2 Solder Joints	(5) Joints Replaced with 2 Solder Joints	(5) Joints Replaced with 2 Solder Joints	(5) Joints Replaced with 2 Solder Joints	(5) Joints Replaced with 2 Solder Joints	(5) Joints Replaced with 2 Solder Joints
(6) Weld Restored and Solder Joint Placed	(6) Weld Restored and Solder Joint Placed	(6) Weld Restored and Solder Joint Placed	(6) Weld Restored and Solder Joint Placed	(6) Weld Restored and Solder Joint Placed	(6) Weld Restored and Solder Joint Placed

Sheet No. *7-95#7*

7th St

6th St

651 +C-3

619 +C-4 +C-3

T-1

REMARKS

Thin Gap - Inspected

FORM USED BY FIELD MEN IN REPORTING BROKEN JOINTS
(Actual size 5 1/2 x 8)

with the rotary type grinders and finished with the reciprocating type. Very little corrugation grinding has been found necessary in Milwaukee. The amount of grinding which is regularly handled by this repair

unit is indicated by the following record for a typical month's work.

	August
Joints ground	1,928
Frogs ground	42
Throatways	22
Mates	36
Switches	9
Total on special work	2,037
Corrugation	69 ft.

Of the total of twenty-two men in this maintenance unit, eight to twelve men are used for the major part of their time on the grinding work and for this reason are partly considered, as a separate grinding unit, though some of these men are transferred when necessary to the welding and bonding work and they are therefore included in the total unit comprising the twenty-two men. There is another unit which divides its time in a general way between cast welding and

ing work, and one 200-amp. General Electric Company welding machine for top welding or building up work. Another G. E. machine has been ordered. It is impossible to draw an arc over $\frac{1}{4}$ in. long with any of these machines. No resistance-type welders are used.

The experience in Milwaukee is that it takes considerable time to break in a man as a welder. His experience and skill are reflected in subsequent maintenance results, that is, in better work rather than in a greater quantity of work. This is therefore also one of the considerations which have led to the advisability of having certain men specialize on this class of work all year around.

In building up cupped joints, the Milwaukee company has been getting excellent results through the use of a welding rod which gives a finished weld somewhat harder than the rail. The welded metal has no tendency to chip out, and being harder than the rail it does not pound out. These rods are purchased in 36-in.



MOTOR-GENERATOR WELDING OUTFIT MOUNTED FOR ROAD WORK

thermit welding work, the size of the unit being increased by hiring additional laborers when cast welding is to be done. The Milwaukee Company is one of the few companies which have had good success with the cast-weld joint, some of these joints being twenty-three years old and still in perfect condition. Having had such good success with this type of weld the company will continue to use it in new work until convinced there is something better. The cast-welding equipment is also used to a considerable extent in maintenance work throughout the year.

The thermit type of weld is used for compromise joints, special trackwork joints and under other special conditions. The electric process of welding joints has been used quite extensively, particularly during the last two years, in repairing defective joints. Altogether, the company now has some 55,000 welded joints of all types in service, and as the age of these joints varies from one to twenty-three years there is an annual requirement of about 2,500 welded joints to be repaired.

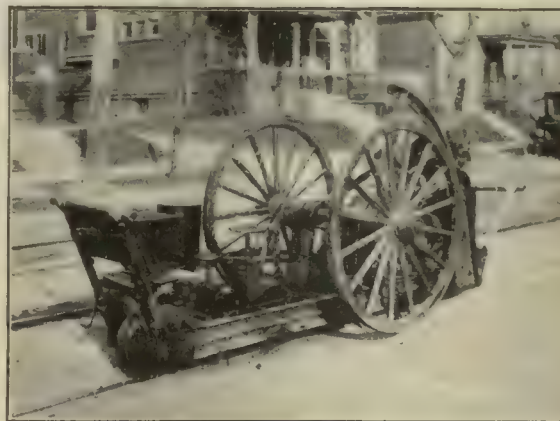
In the electric welding work the company makes use of two type W, 400-amp. welding machines supplied by the Rail Welding & Bonding Company, for welding joints and building up cupped rail; two type-B, 200-amp. Rail Welding & Bonding Company machines for bond-



ROTARY GRINDERS USED TO REMOVE ROUGH SURFACE AFTER WELDING

lengths and $\frac{1}{4}$ -in. and $\frac{1}{2}$ -in. diameters, and have this composition: Si, 0.15 maximum; S, 0.04 maximum; P, 0.03 maximum; Mn, 0.30 to 0.60; C, 0.85 to 1.10.

A complete inspection of the entire system is made during each year, covering all joint failures. The field men are provided with a convenient form on which to record the location and nature of these

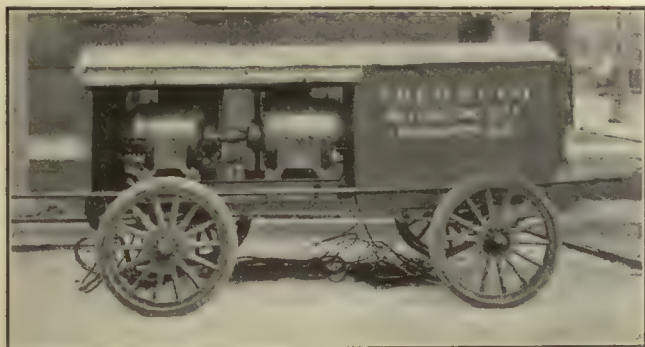


RECIPROCATING GRINDER USED TO FINISH OFF THE RAIL AFTER WELDING

failures, the form being so arranged that the information is recorded with very simple notations. A separate sheet is made for each block of each line. A typical report as sent in by a field man is reproduced herewith. The information printed at the top of the form gives data which are very effective in simplifying the record work of the field man and the location of failure is roughly indicated by placing a dot on the form at a position corresponding to the location of the joint in the block and on the particular rail.

The data thus obtained by the field men are transferred in the main office to a map of the city system drawn on a scale of 1,200 ft. to 1 in., so that one can tell at a glance at the map just where the bad spots in the track system are. This, of course, usually means the old track locations. The different types of defective welded joints are shown in different colors.

With this information on the map to go by, a nightly



SPECIAL TRACKWORK MAINTENANCE UNIT AND EQUIPMENT



SUPPLY FORD HAULS MATERIALS AND WELDING OUTFITS

program of repair work is readily laid out in groups of 30 to 40 joints so that the work of the repair force can be expeditiously accomplished without involving too great moving distances between points. The welders, cupola, thermit and electric, are preceded by a special gang, which removes the pavement around the defective joints, and closes the pavement after the joints have been repaired. This repair unit is equipped with air compressors, concrete cutters, tie tampers, and equipment and materials for mixing concrete and grout to fill up the pavement openings.

Each of the general track maintenance gangs is equipped with an oxyacetylene torch for cutting rail and one for use in bonding. Where these men make emergency repairs to a joint that is somewhat pounded down, or to a broken rail, they take out a piece of the rail by sawing down through the head and then cutting the rest of the way through the web and base with the torch, angling the cut back somewhat so that the head of the rail and the insert piece can be brought together with smooth surfaces in contact, perhaps using shims. When such a repair is made a bond is placed around the joint with the acetylene torch to carry the return current temporarily until this joint is permanently repaired.

A third unit which specializes in certain work is under the direction of a supervisor of equipment. He has charge of all the power driven equipment of the way department, both as to maintenance and operation, except where a piece of equipment may be permanently assigned to a certain gang. Generally speaking, when any piece of equipment is needed, application is made to the supervisor of equipment, who supplies the machine required and an operator with it. He is also responsible for all maintenance work on all equipment wherever it may be in use and his men are picked for

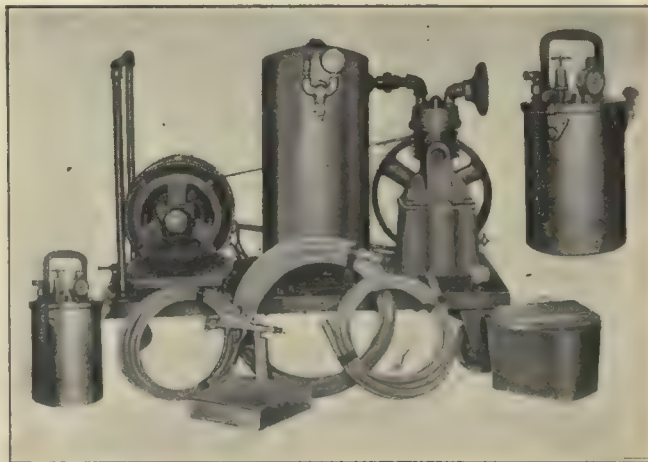
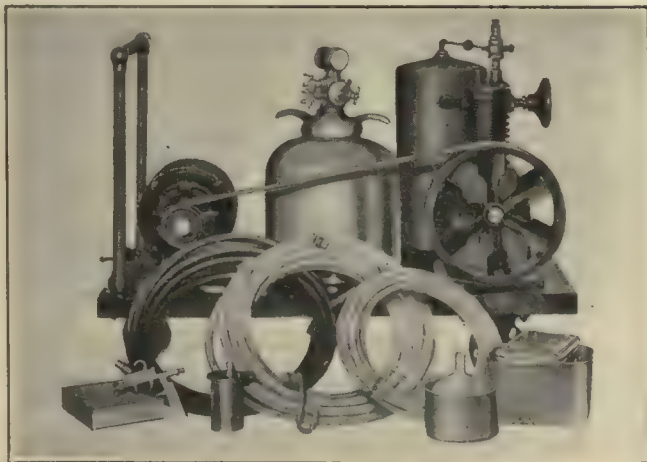
their special ability along this line. The extent of the equipment used by the Milwaukee company is very great, for money has been made available for the purchase of any machine that could show results in labor savings.

In all the interurban track and tie renewals, untreated Northern white cedar ties with tie plates are used. These are found to be the cheapest in annual cost, considering length of life and first cost when plates are used, for the failure of cedar ties is principally mechanical, due to rail cutting before deterioration takes place. Many of the cedar ties now in use have been in service for twenty years and are still good. Long leaf yellow pine ties are used in paved streets and white oak ties for special work.

New Portable Spray-Painting Equipment

THE accompanying illustrations show two types of hand motor-driven spray-painting outfits intended for one-man operation. These are the products of the DeVilbiss Manufacturing Company, Toledo, Ohio, and are designed for maintenance work in shops which are provided with electric current. These outfits can be handled by a single operator. The smaller outfit, designated as TP-601, is furnished complete with a $\frac{1}{2}$ -hp. motor, compressor and air reservoir mounted on a portable platform truck. The complete equipment also includes a 1-gal. pressure paint tank and necessary hose.

The larger outfit, designated as type TJ-601, has sufficient capacity to give a working radius of 100 ft. from the compressor to the paint tank and 25 ft. from the paint tank to the operator. A 7-gal. paint tank is furnished, together with extra lengths of fluid hose and repair parts.



SMALL HAND TRUCK SPRAY-PAINTING OUTFITS FOR ONE OPERATOR

A few Labor-Saving Methods from Fort Worth

The East Front Street Shops of the Northern Texas Traction Company Are Laid Out to Give Efficient Routing of Work and Easy Handling of Equipment

BY J. T. PORTER

Master Mechanic Northern Texas Traction Company,
Fort Worth, Tex.

UPON the completion of the new machine shop and repair tracks at the East Front Street shops of the Northern Texas Traction Company, Fort Worth, Tex., several labor-saving and time-saving devices were installed which have been of great assistance in keeping down maintenance costs.

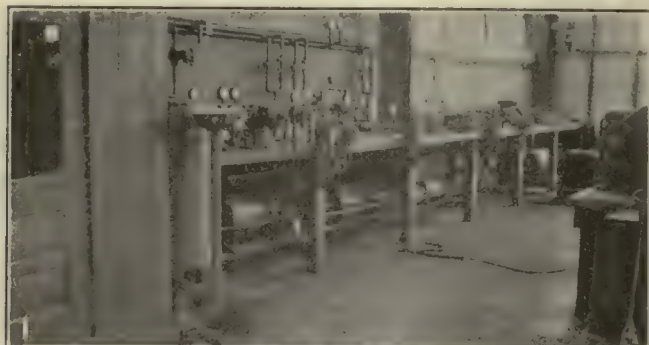
An accompanying illustration gives a complete view of the air-test bench. We have two air mains leading to this bench from the main air reservoirs in the shop. Main No. 1 has 90 lb. pressure, and main No. 2 has reservoir or 120 lb. pressure. By means of necessary valves, gages, cylinders, etc., we are able to test all air equipment, for city and interurban cars, including air governors, triple valves, engineers' valves, double check valves, feed valves, pilot valves, emergency valves, door engines and brake cylinders.

OVERHAULING AND TESTING COMPRESSORS

Another illustration shows a close-up view of our air compressor work bench. This bench is 9 ft. long, 2½ ft. wide, and 2½ ft. high. Suspended underneath the bench is a 16-in. x 36-in. air reservoir. Also shown in the illustration is the air gage connected to the air reservoir and the two pet cocks. One has a ⅜-in. orifice, the other has a ¼-in. orifice. After a compressor has been repaired it is hooked up to the reservoir under the bench by means of the standard ⅜-in. hose and coupling, and the compressor is tested to see whether it will pump to its required pressure within its allotted time. After the required pressure has been reached in the reservoir, one of the pet cocks is opened (depending on the capacity of the compressor) and the compressor if in good condition will keep the pressure up to 75 lb. in the reservoir while the air escapes through the pet cock. Sixteen-foot compressors are tested with the ⅜-in. orifice open, and the 25-ft. compressors are tested with the ¼-in. orifice open.

The bake oven in use by the armature department for baking armatures is another important adjunct. The heat is controlled by a 210-deg. Fahrenheit thermostatic control system as made by the Consolidated Car Heating Company. The bake oven was made in our blacksmith shop out of No. 10 gage sheet iron. It is 6 ft. long, 4 ft. wide, and 3 ft. high. The heat is supplied by two circuits of 600-volt standard car heaters as made by the Consolidated Car Heating Company. The jib crane shown in the illustration has a radius of 10 ft. and facilitates the putting in and taking out of armatures to the oven from the banding machine or armature racks.

The armature rack shown in another illustration is self-supporting and can be placed in any convenient space about the armature department; it is a cupped-



Testing and Overhauling Equipment

- No. 1—Test bench for air brake parts.
- No. 2—Air compressor repair and test bench.
- No. 3—A conveniently located jib crane serves the baking oven.
- No. 4—Removing car wheels with a pit jack.
- No. 5—Self-supporting armature rack.
- No. 6—Armature rack mounted on wall.

shelf construction and will hold all types of small armatures, thus eliminating the many special racks for the various types of armatures. Armature racks of the same construction are mounted on the wall to take care of defective and other armatures that are seldom used.

The wheel jack which we have is a great labor saver as well as a time-saving device. By means of the overhead cranes the car body and truck weight is taken from the wheels and the wheels are then dropped out of the truck and rolled on the wheel-changing carriage to the wheel-storage track as shown. At the wheel-storage track a new pair of wheels is placed on the carriage and rolled into place under the car. The carriage is raised and lowered with an 8-in. hydraulic ram. A tank of sufficient capacity is located in a small pit filled with oil which is used to displace the ram. The ram is operated with a brake valve, the air line having a constant pressure of 80 lb. The wheel-storage track is constructed with two standard-gage tracks staggered on the same ties, thus giving nearly double the storage capacity of wheels on the one track space. The cranes for picking up the wheels and the wheel jack carriage, running on its own narrow-gage track, are great labor savers.

Our method of changing air compressors is very efficient. The car is placed so that the air compressor is directly over the wheel-jack carriage. The wheel-jack carriage is then moved out of the way, giving a clear space to work in. A hand jack made by the Electric Service Supplies Company is then used to remove and replace the compressors. This system of changing compressors saves much time and also saves hard labor on the part of the men.

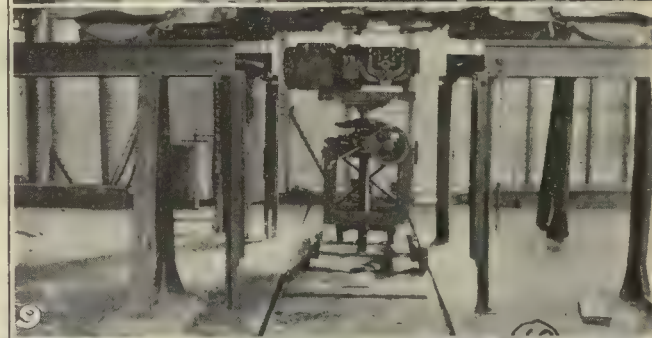
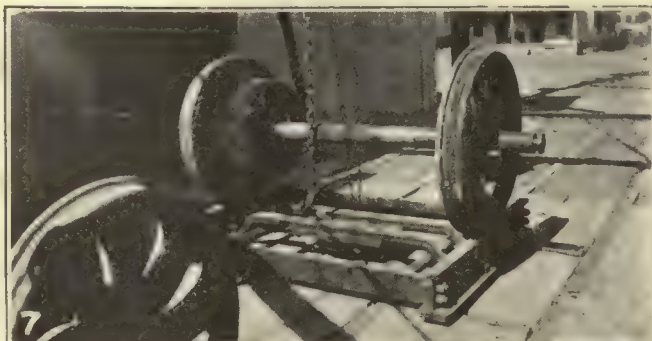
AIR PRESS FOR REMOVING ARMATURE BEARINGS

An air press made in the shop and used principally for pressing armature bearings in and out of box frame motors is another handy piece of equipment. The lever arm has holes spaced at different distances from the fulcrum, thus permitting different pressures to be applied by changing the arm in the working side of the lever to the hole desired. With 110-lb. air pressure on the 12-in. air cylinder pressures up to 30 tons can be applied.

The arrangement of the machines as shown in the general view of the machine shop was made after a careful study relative to the effectiveness of a good layout. On the right-hand side of the picture are shown the wheel press, boring mill, wheel lathe, 42-in. lathe and 26-in. lathe. On the left-hand side are shown the tool grinder, power saw, drill press, pipe threading machine, bolt machine and shaper. At the rear is shown the armature department, containing bake oven, banding lathe and work bench. Traveling the full length of the shop is a 5-ton electric crane. Throughout the length of the shop is a 36-in. track connected to two branch lines at right angles by turntables. These two branch lines lead directly to the two wheel-changing jacks. The wheel-jack carriage runs on this narrow-gage track, thus facilitating the disposal of old wheels by leaving them at the wheel lathe, wheel press, etc.

Handling Wheels and Compressors

- No. 7—Wheels are placed on a wheel-changing carriage.
 No. 8—Wheel storage track with convenient crane and hoist.
 No. 9—Pit jack carriage used for removing compressors.
 No. 10—General view of machine shop.
 No. 11—Overhead traveling cranes raise the car body.
 No. 12—Press for installing and removing armature bearings



Lift Truck Produces Substantial Savings in Railway Shop

Third Avenue Railway, New York City, Is Finding Many Opportunities for Handling Maintenance Material by a Tier-Lift Truck Operated by One Man

THE problem of economical and speedy handling of all classes of railway shop materials is being effectively solved by the use of a lift truck in the shop of the Third Avenue Railway, New York, N.Y. This truck has been in use only a very short time, but the multitude of uses indicates the immense value and the substantial saving that can be brought about by lessening handling costs, increasing storage space and speeding up the transference and handling of material.

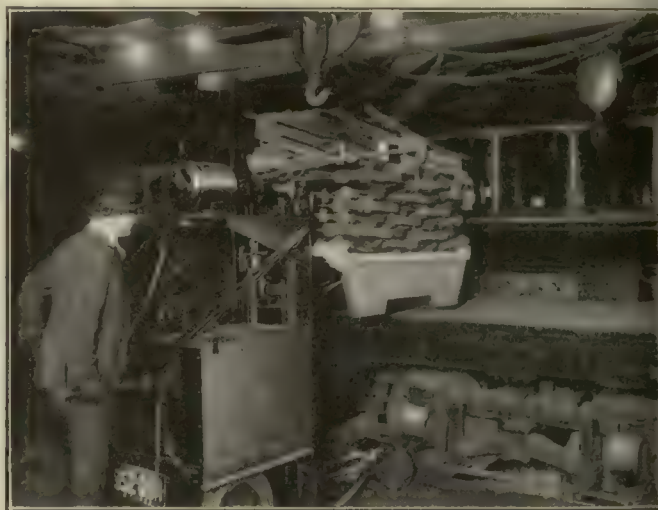
Before the introduction of this truck materials were transported about the shop through the usual type of hand-drawn trucks found in most electric railway shops. The various machine tools were served by either jib cranes or traveling cranes, and where it was necessary to transport the material by means of a supply car, this was loaded by hand with the various small parts

at the extreme inside corner of 42 in. and for the outer wheels, 78 in. The wheels are fitted with solid rubber tires, the operating end being 20 in. x 3½ in. and the platform end 10 in. x 4 in. The weight of the truck without batteries is 2,400 lb. The motor for main drive is 24 volts, 65 amp., series wound, entirely inclosed and dustproof. The lifting motor, which is an independent unit, is 24 volts, 40 amp., with ample overload capacity for short periods.

The battery used is the General Lead Battery Company's standard industrial truck type. It has twelve cells of seventeen plates each of the "H" (heavy) type, the positive plates being ⅜ in. thick. The battery has a capacity of 252 amp.-hr., at the four-and-one-half-hour rate of discharge equivalent to 6 kw.-hr. Special compound non-breakable jars, ⅝ in. thick, are used. The trays



A LOAD OF MAINTENANCE MATERIAL READY FOR LIFTING TO THE SUPPLY CAR



DEPOSITING A SKID LOADED WITH CONTACT PLOWS AND FENDERS ON A CRANE CAR

which could be conveniently lifted by one or two men, a crane on the car handling the larger parts. Some of the revised methods inaugurated since this truck was received are shown in the accompanying illustrations.

The particular truck in use is the Lakewood Engineering Company's tier-lift truck, model 703. This truck has a load capacity of 4,000 lb., which may be lifted at a rate of 1 ft. in eighteen seconds to any height between 11 in. from the floor up to 60 in. Where it is particularly desirable to save time, the load can be lifted while the truck is being operated to transport the load. The truck has an over-all height of 79½ in. and an over-all length of 121½ in. with the steering handle in operating position and 109 in. with the step and steering handle folded. The over-all width is 36 in. The platform consists of a steel checkered plate with a length of 54 in. and width of 26 in. The platform height in the lowered position is 11 in. from the floor. The drive is two-wheel, with worm and gear, with a wheelbase of 62 in., wheel tread at the operating end of 27 in. and wheel tread at the load end of 19½ in. This truck has a turning radius at the extreme outside corner of 92 in.,

are hard maple, slow-heat paraffined and then treated with acid-resisting asphaltum paint. Bolted connectors are used for cells and the Westinghouse patented joints for tray connections. The battery complete weighs 685 lb.

To operate the truck, the operator stands on a low step. The controller is conveniently located at his left hand when he faces the platform and the steering lever is on his right. Three speeds forward and three reverse speeds are provided. A small controller located immediately in front of the operator with one speed in either direction controls the up and down operation of the load platform. This control includes dynamic brake contacts to stop the load platform instantaneously in any desired position. This controller is automatically returned to neutral position when the load platform reaches its maximum tiering height or its extreme down position.

The brake action and a safety switch are controlled by a foot pedal on the platform. This arrangement is such that the brakes are fully released and the switch closed when the pedal is pushed down flush with the

floor. When the operator steps from the truck or removes his foot from the pedal the safety switch in the controller automatically breaks the current. At the same time the brakes are automatically set. It is thus practically impossible to operate the truck except in the normal operating position.

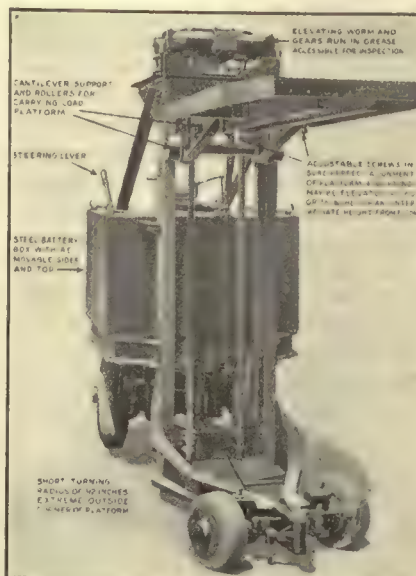
LOAD PLATFORM HAS CANTILEVER SUPPORT

The stresses set up by the load on the platform are carried by a cantilever type support and are distributed through heavy steel rollers, each mounted on two high grade annular ball bearings. The load on the platform is balanced over the load carrying wheels, which eliminates the tendency for the truck to tip when the load is raised.

There are two adjusting screws under the platform to insure perfect alignment of the platform should the rollers wear slightly after long usage. The load platform is lifted by two forged steel phosphor bronze bushed trunnion nuts. These trunnion nuts operate on two vertical steel screws.

The housing in which the two worm gears at the top of the column are mounted is supported on a trunnion. Hence it may oscillate to obviate any possibility of binding on the vertical screws due to the twisting of the frame or slight wear in the cantilever support rollers. This housing is packed in grease. The frame for supporting the column and the axles is made of cast steel. The load platform of corrugated steel is hinged at the column end so that if it should strike an obstruction when the load is being lowered it would simply raise the platform and not strain the supporting mechanism. The battery box is made of sheet steel with sides and top removable, so that the batteries are accessible for inspection and maintenance repairs.

The combination of an elevating platform with a load-carrying truck assists materially in lessening handling costs, as much of the material handled in any electric railway maintenance shop must ultimately be raised to machines or benches or lowered to the shop floors. With such a type of truck it is possible to run the platform underneath the compressor of a car, raise the platform so as to support the compressor while it is being loosened from its supports, then lower sufficiently to clear the car body and back out of the way. The compressor can then be transported to the overhauling shop and be placed on the compressor overhauling bench



LIFT TRUCK WITH PLATFORM RAISED

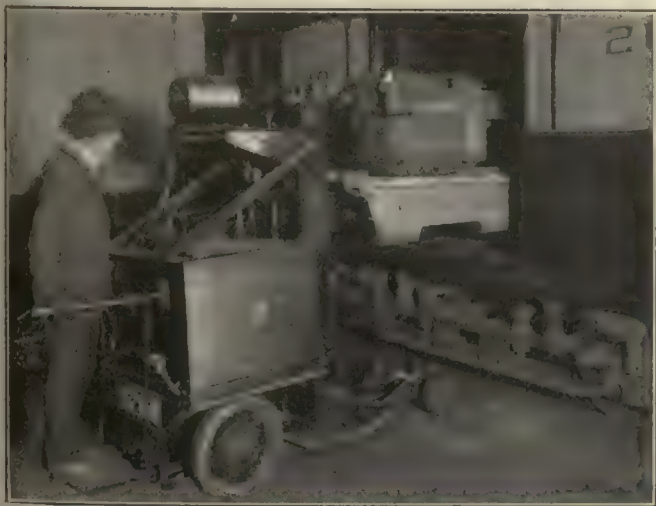
by one man. The reverse operation can also be carried out by one man when the compressor is ready for reinstallation. Ordinarily such an operation would require from two to six men, and the time consumed would be materially greater. Also many of the disagreeable features of the work are removed, as the truck does the lifting and transporting and the operator finds real

enjoyment in propelling the various parts through the shop and in placing them in repair locations.

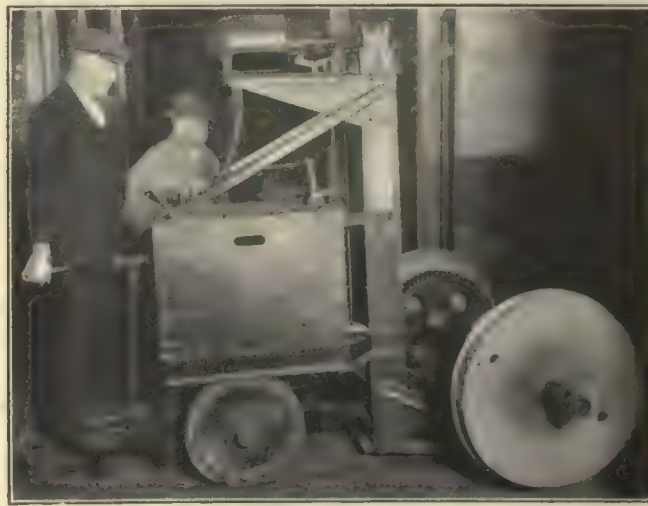
WHEELS CAN BE PICKED UP AND PLACED IN WHEEL LATHES FOR TURNING BY ONE MAN

The serving of the various electric railway shop tools by a lift truck is another economy being practiced by the Third Avenue Railway. An accompanying illustration shows the truck just as it has picked up a pair of wheels as they were removed from a car. The platform is low enough so that it can be run underneath the axles of the smallest pony wheels and the lift of the platform is sufficient to take care of the largest drivers. Without further work the operator can transport the wheels to the machine shop and place them in the wheel turning lathe for turning or in the wheel press for removal of the wheels. Most electric railway shops, however, are equipped with cranes for handling wheels into and out of these machines. In such cases the truck can deposit the wheels in a convenient location or, where space accommodations are limited, the storage capacity can be increased considerably by piling the wheels as desired.

Other work readily taken care of by this truck in-



HEAVY MOTORS ARE READILY LOADED INTO SUPPLY CARS BY ONE MAN



WHEELS CAN BE PICKED UP FROM CARS AND READILY TRANSPORTED TO SHOP FOR OVERHAULING

cludes the picking up, transporting and placing of motor shells in lathes for re boring, the placing of shafts, armatures and other heavy parts in lathes and the handling of heavy castings which require drilling. Two of the accompanying illustrations show the lift truck in the operation of placing skids of maintenance material in position on supply cars. The Third Avenue Railway uses several types of supply cars for transporting various maintenance materials to the shops and points where they are used. One of the illustrations shows a skid loaded with contact plows and fenders being loaded on a large crane car, while another shows the truck in the act of depositing a large motor through the door of another supply car. The economies resulting from this rapid and easy handling of material by one man will be

readily appreciated by those engaged in such work. For convenience in handling various classes of small material, it is desirable to use platform body skids, platform boxes, dump skids and roller platform skids. To meet these conditions the Lakewood Engineering Company has developed a very complete line. Material can be kept in the storeroom racks on platforms and can be taken out as each set of parts is required. Where space is at a premium, the various types of skids can be piled one on top of the other and can be so arranged that these can be removed without disturbing the loads in other parts of the pile. In storerooms which are provided with such a truck, properly designed racks will effect material economies in storage and also give facilities for depositing and removing loads.

Two Aspects of the Tie-Treatment Question

"Shall Tie Treatment Be Charged to Maintenance?" Is First Considered, After Which the Author Gives Statistics as to the Subject in General and Shows When Tie Treatment Pays

BY HOWARD H. GEORGE

Engineer of Maintenance of Way, Public Service Railway,
Newark, N. J.

IN THE ISSUE of the *Railway Age* for Feb. 18, 1922, page 416, there appears an article by Earl Stimson, chief engineer of maintenance, Baltimore & Ohio Railroad, entitled "Should the Cost of Treating Ties Be Charged to Maintenance?" The basis of the reasoning in Mr. Stimson's article was this question: Should the treatment of a wooden tie with preservatives be considered in the same category as the case of a wooden tie being replaced by a steel or other substitute tie, thus entitling the cost of the treatment to be capitalized? His conclusion, from the viewpoint of the maintenance engineer rather than that of the accountant, was that the practice on his property of charging the cost of treating ties to maintenance is justified.

A section of the I. C. C. classification of accounts for steam roads was quoted to show that the intent of the classification, as far as ties is concerned, is to permit of capitalizing only the excess cost of metal ties over wood ties, and does not make any mention of excess cost of treated over untreated wood ties. Mr. Stimson's contention, however, that it is plainly evident that the commission did not intend to consider treatment as a "betterment" is not borne out by the facts. Although it is true, as he stated, that in the above classification no specific mention is made of treated ties, it is equally true that in the commission's definition of the term "betterment" no specific mention is made of many other items which are properly considered as betterment. The corresponding account (No. 6, Road and Equipment) in the standard classification of accounts of the American Electric Railway Accountants' Association reads as follows:

6—Ties—To this account should be charged the cost of cross, switch, bridge and other ties and railway crossing timbers laid in main and repair tracks, sidings, and spurs; in tunnels, station, shop and other yards; on wharves, piers, track scales, inclines, bridges, trestles, culverts, in carhouses, shops and storehouses, and on transfer tables and turntables. To this account should be charged also the cost of transportation, inspection, handling (except final distribution) and any process of preservation.

Mr. Stimson took the position that if the earnings are

large, it is desirable to put a portion back into the property. It is gratifying to know of a railroad property whose earnings today are large enough to be able to pay for betterments of this character, but such a state of affairs exists on but few electric railway properties. On the other hand, many of the latter who, a few years ago, were using treated ties almost exclusively have been obliged as a temporary expedient either partly or entirely to discontinue the use of treated ties because of the demand for immediate economy in order to tide over the present emergency.

TIE RENEWAL ON STEAM AND ELECTRIC ROADS COMPARED

There is no question that, from the viewpoint of the average steam road maintenance engineer, whose main problem is either extensive tie or rail renewal (but seldom both at the same time in the same track), the logical place to charge the treating cost is to maintenance. Certainly it is true that casual renewals of a few ties here and there on electric railway properties are and properly should be charged to this account. It is not practicable to split charges for such renewals between operation and construction. In the case of major renewals, however, where the entire structure is being rebuilt or entirely replaced, and the estimated or actual cost of the old track is written off, it would seem to be decidedly unfair to charge to operating expenses the increase in cost of a treated tie due to the treatment itself.

Suppose that we consider from the electric railway standpoint the case of a track being entirely replaced. The original track was constructed with untreated wooden ties which cost and were capitalized at, let us say, 80 cents each when the track was built, while the new track is being constructed with creosoted ties costing, say, \$1.75 each. It is customary in such cases to write off the entire estimated original cost of such track and charge the entire cost of such new track to the capital account. If this is done, the addition to fixed capital will certainly include the difference between the

cost of the old ties and the cost of the new ties, and a part of this difference is the cost of treatment.

In the same way, if an untreated red oak or short-leaf pine tie had been replaced by a good white oak tie, which always costs more than the first-mentioned ties, the excess cost would also have been included in the amount chargeable to new capital. Similarly, if a piece of new track with treated ties were being built as an extension, whether by a steam road or by an electric road, the cost of treatment would certainly be capitalized along with the other costs. Added value undoubtedly accrues to the track, increased life of the substructure surely results. There is also a proportionate decrease in the annual maintenance charges for tie renewals, and, what is even more important in the case of street railways, in the cost of replacing the concrete base where ties have to be replaced. The substitution of a tie which will last at least twenty years in a track for an untreated tie having a life of only ten or twelve years should certainly be considered a betterment. An excellent example to prove the value of creosoting ties is the case of track laid in Denver in July, 1898, and reconstructed during the summer of 1920, a description of which appeared in the issue of the *ELECTRIC RAILWAY JOURNAL* for Jan. 22, 1921, page 187. After twenty-two years of continuous service, these ties, which were of hemlock, were found to be in an excellent state of preservation.

MECHANICAL WEAR RATHER THAN DECAY INTERESTS THE STEAM RAILROAD ENGINEER

It is to be expected that the viewpoint, on this subject, of the steam railroad engineer, whose general experience is that the most frequent cause for tie renewal is not decay but rather mechanical wear, will differ materially from that of the street railway engineer, with his radically different conditions. Of course, treatment does not increase resistance to wear. Mr. Stimson stated that "in the case of a metal tie substituted for a wooden tie, there is unquestionably a substitution of a superior part for an inferior part, as the tie is made of a radically different and structurally superior material." Now the life of a tie in a street railway track is seldom determined by its mechanical strength, but rather by its ability to resist decay, and a properly treated wooden tie has fully demonstrated its ability to do this. It is a common occurrence to renew rail on creosoted ties without disturbing the ties, ballast or concrete paving foundation in the slightest degree. Hence if it is reasonable that the excess cost of steel over wood ties should be capitalized, the same is true of the cost of tie treatment.

In one paragraph of the article in question appears the following statement:

The rapid rise in the price of timber has increased the price of the tie in much greater proportion than the cost of treatment has increased. Less expensive treatments that have been found adequate are being used more and more in place of the more expensive treatments formerly considered necessary. The result has been that the ratio of the cost of treatment to the price of the tie has decreased greatly, making the use of treatment not only show greater economies but also reducing the proportion that the excess cost of treatment bears to the total cost of the treated tie. This should in itself stimulate the use of treated ties and not make necessary resorting to the doubtful expedient of capitalizing.

The statement of facts in this paragraph cannot be controverted, although exception will probably be taken by many to the conclusions drawn as to the matter of doubtful expediency of capitalizing treatment of ties for all conditions which have to be considered. It is

believed, however, that the thought contained in the above statement as to the economies to be effected by treating ties and timber should be emphasized and advantage taken of this opportunity again to bring to the attention of our industry the urgent need for a greatly increased use of wood preservation. The steam railroads for years have been treating large quantities of timber, especially ties, realizing the importance of conserving as much as possible the available supply, but electric railways have, as a general rule, not appreciated the value or need of treatment to the same degree, and have not adopted it to anywhere near the same extent as the steam roads.

WHAT IS OUR TIMBER SITUATION?

Leaving now the subject of charging tie treatment to one account or another, let us examine the timber situation as a whole so as to appreciate the necessity for more extended use of preservative treatment.

E. H. Clapp, then assistant forester, Forest Service, United States Department of Agriculture, in testifying before the Committee on Interstate and Foreign Commerce of the House of Representatives on July 19, 1919, regarding the shortage of railroad ties (see report on House Resolution No. 20, 66th Congress), stated that the maximum requirement of ties reached about 150,000,000 in 1907, falling to a little under 100,000,000 in 1915, and that the average for the preceding fifteen years had probably been in the neighborhood of 125,000,000 ties, representing a total of about 4,000,000,000 ft., board measure, these figures including both steam and electric lines. Lumber production for all purposes in the United States reached the total of 46,000,000,000 ft. b.m. in 1906 and 1907, dropping to 40,000,000,000 ft. b.m. in 1914 and to 32,000,000,000 ft. b.m. in 1918. Including other wood products, such as fuel wood, the total annual cut of timber in the United States probably reaches between 90,000,000,000 and 100,000,000,000 ft. b.m. It was estimated that in addition to the above, probably about 10,000,000,000 ft. b.m. should be added to cover losses by fire. The original forest area of the United States was estimated at about 850,000,000 acres, of which about 230,000,000 acres of mature timber was standing at that time, or not much more than 25 per cent. The total forest acreage at that time, including cut-over lands, was estimated at about 500,000,000 acres, of which about 100,000,000 was very largely waste and another 180,000,000 acres had some timber on it of comparatively inferior quality. Mr. Clapp stated that the annual growth was only about 35,000,000,000 ft. b.m. as against an annual consumption of between 100,000,000,000 and 110,000,000,000 ft. b.m. *Commerce Reports* for Feb. 6, 1922, states that a total of 3,149,788 railway ties were exported during 1921, of which almost half went to Canada.

Against the above total consumption of timber there was treated in 1909 (see report United States Department of Agriculture, Forest Service) only a little over 911,300,000 ft. b.m. of timber of all kinds, which included only about 20,700,000 ties, or about 745,000,000 ft. b.m. In 1913 the amount of timber treated for all purposes had increased to a total of a little less than 2,000,000,000 ft. b.m., which included about 43,850,000 ties, or about 1,580,000,000 ft. b.m., and in 1918 the amount of timber treated for all purposes had dropped to about 1,470,000,000 ft. b.m., which included about 30,600,000 ties, or about 1,102,000,000 ft. b.m. The total average amount of timber treated for the ten years preceding 1918 was only about 1,584,000,000 ft. b.m., which

included only about 33,000,000 ties, or about 1,190,000,000 ft. b.m. Compare this with the total average consumption of, say, 125,000,000 ties per year and the result is only about 25 per cent. Or, if we compare the total lumber consumption per year of 110,000,000,000 ft. b.m. with the total amount of timber treated for all purposes of about 1,584,000,000 ft. b.m., the result is only about 1.40 per cent.

ELECTRIC RAILWAYS ARE BEHIND IN TIE TREATING

The total mileage of electric railways in the United States is, roughly, 44,000. The writer has just had occasion to analyze the replies to a questionnaire on railroad ties sent out by the American Electric Railway Engineering Association, in order to secure data on present practice among member companies for the use of its representative on the sectional committee on standardization of railroad ties which has been formed under the direction of the American Engineering Standards Committee. The member companies number about 350 and represent a total of about 33,500 miles of trackage. At the time of the writing of this article 179 replies had been received from companies having a total of 26,006 miles. This covers more than 51 per cent of the total number of member companies and nearly 78 per cent of their total mileage, or about 60 per cent of the total electric railway mileage in the United States. Out of the 179 companies which replied only sixteen, representing 2,140 miles of track, reported using all treated ties. Forty-two companies, with 7,628 miles of track, reported using part treated ties, while 121 companies, with 15,238 miles of track, reported using no treated ties. The companies reporting were from practically every state in the Union and included every large property. The result of this canvass may therefore be taken to represent, with a reasonable degree of accuracy, the situation throughout the country. According to the above analysis only 8.9 per cent of the electric railway companies, representing 8.2 per cent of the total mileage, are using all treated ties, another 23.4 per cent of the companies, representing 29.3 per cent of the total mileage, are only partly using treated ties, while the remaining 67.7 per cent of the companies, representing 62.5 per cent of the total mileage, are using no treated ties whatever. These figures represent 1922 practice among our street railways.

Not every company is as fortunate as the Boston Elevated Railway, which, in 1916, installed its own pressure wood-preserving plant (see *ELECTRIC RAILWAY JOURNAL*, Nov. 18, 1916, page 1065), but many are located within reasonable distance of some commercial timber treating plant, and there is always left for consideration the open tank and dipping processes, which are better than none at all. And for other timber there are still available the brush or spray treatments, which have their merits. When all the facts are considered, it is quite probable that either the open tank, dipping, or brush treatments will be most practical from an economical standpoint. The question resolves itself into one of "How much can we afford to spend for treatment?"

ECONOMIC FEATURES OF TIE TREATMENT

E. F. Paddock has compiled a very complete set of tables showing the annual charge in per cent of the total original cost for various periods from one to twenty-five years, with interest at 5 per cent. From this table we find that the annual charge expressed in per cent of the original cost of an article whose total life is, say, five

years figures out to be 23.0975 per cent. If its life is seven years this annual charge figures out 17.282 per cent of the original cost; if ten years, the annual charge is only 12.9505 per cent, and so on. To apply this to the case of a tie, assume an untreated tie which has decayed in five years to the point necessitating renewal, the tie having originally cost 65 cents delivered or, say, 85 cents each in the track. The annual charge at 5 per cent on 85 cents for five years is therefore 23.0975 per cent of 85 cents or 19.6 cents. Suppose it can be demonstrated that open-tank treatment would increase the life of such ties to ten years and that it cost 25 cents to treat the tie by such a method. The total cost of the treated tie would then be 85 cents plus 25 cents or \$1.10, and the annual charge would be 12.9505 per cent of \$1.10 or 14½ cents, as compared with 19.6 cents for the untreated tie, a saving of 5½ cents per year per tie. If ties are laid on 2-ft. centers, this means 2,640 ties per mile, a saving of \$140.80 per mile per year. On a property of, say, 100 miles this means \$14,080 per year or the equivalent of a 4 per cent dividend on \$352,000.

Or, to cover the case of a treatment which would add only two years life to such a tie, we can then afford to increase the initial cost of such a tie to 1.336 times the cost of the untreated timber. We can afford to spend 33.6 cents on every dollar's worth of such timber that will increase its life from five years to seven years, without increasing the annual charge. With lumber at \$60 per thousand feet board measure this would amount to \$20.16 per thousand feet for treatment. If the treatment increases the life from five to ten years, this figure is 78.35 cents on every dollar, or \$47.01 per thousand feet board measure.

As was shown, we are producing only about one-third as much lumber as we are consuming each year, and the figures given should serve to emphasize the urgent need of conserving our timber supply as much as possible and to show the economies to be effected by the use of wood preservation and the effect a greater use of such preservation would have on such a program of conservation.

Electric Railways Earned 4.11 per Cent in 1919

OF THE 1,603 electric light and power companies making income tax returns for 1919, 454 had no net income whatever. Among 1,046 electric light and power companies it was found that the net income was 6.53 per cent of the invested capital. The figures have just been compiled by the Bureau of Internal Revenue. The total net income of 1,149 electric light and power companies was given as having been \$49,515,624 in 1919. On this income tax to the extent of \$4,639,440 was paid, in addition war profits and excess profits taxes were paid to the amount of \$1,164,563. The deficit reported by the 454 companies which reported no net income was \$4,360,909.

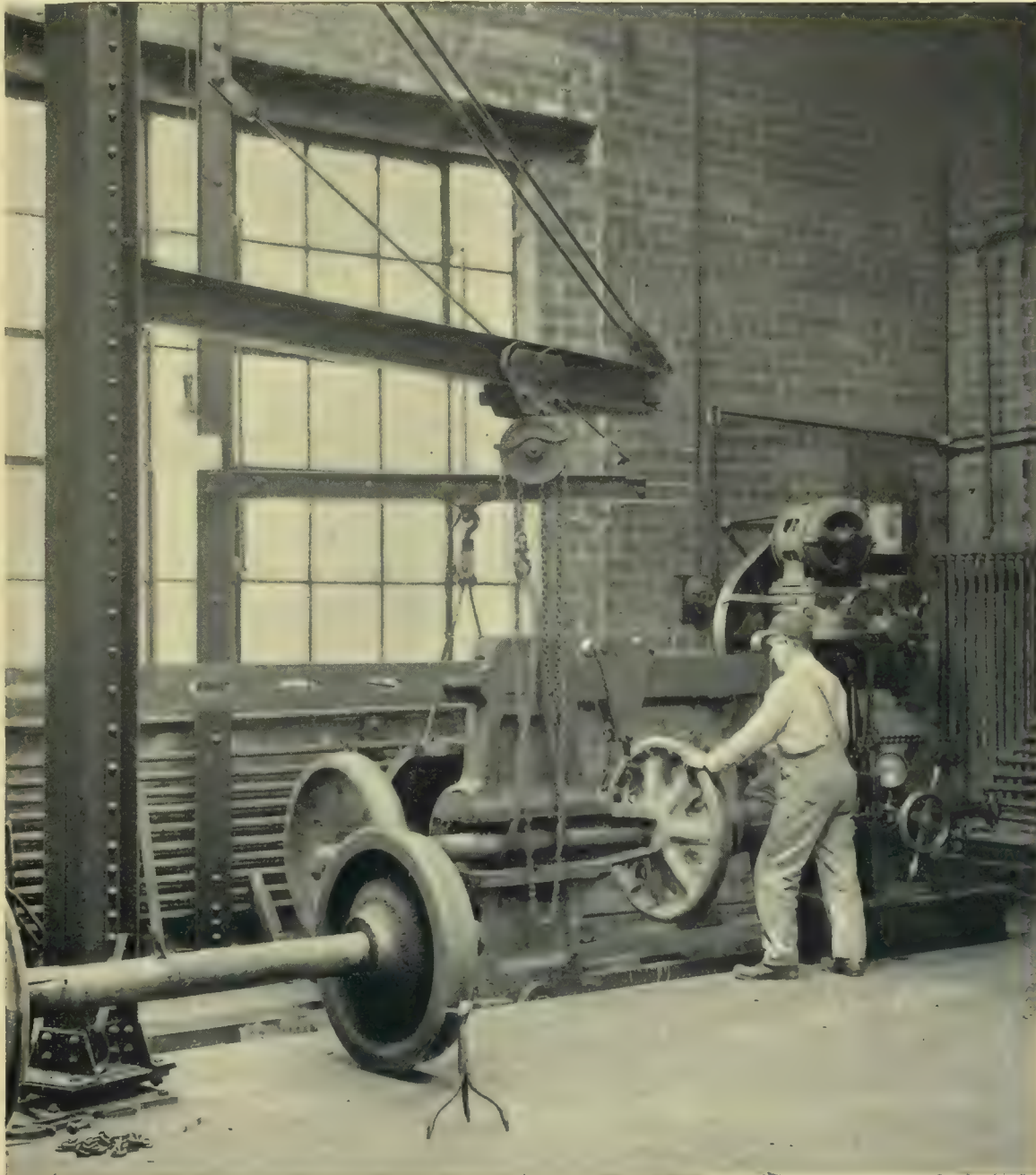
According to the bureau's figures, all transportation and other public utilities show their net income to have been 6.39 of the invested capital. For the steam railroads the figure was 4.78 per cent; for electric railroads, 4.11 per cent; for ocean lines, 23.46 per cent; for gas companies, 6.07 per cent; for telephone and telegraph companies, 7.01 per cent.

There were 242 electric railways which reported a net income of \$29,387,511. Their total tax was \$3,126,002. There were 196 electric railways which had no net income. Their deficit is shown as being \$10,860,272.

Special Pictorial Section

"Do It Mechanically"

Labor-saving machinery is gradually supplanting hand and muscle methods, but a more extended use of it can well be made by all electric railway maintenance departments. Examples from various cities are shown in the following pages.



One Man, with Proper Equipment, Can Do a Surprising Amount of Work, and at a Minimum of Cost

An example of up-to-date practice is shown in the above illustration—a wheel press in the shops of the Tri-City Railway & Light Company, Davenport, Ia.,

admirably served by cranes and hoists. With this outfit, a single operator performs all of the various operations with ease.



**Handling Material
in the
Storage Yard
of the
Chicago Surface Lines
at Thirty-ninth
and Halsted Streets,
Chicago**



- No. 1. Handling trackwork with a 5-ton crane car.
- No. 2. Handling excavated material by auto truck.
- No. 3. Electrically operated yard derrick for unloading and piling rails.
- No. 4. Storage space is saved by careful piling.
- No. 5. A yard crane equipped with grab bucket unloading old paving blocks.
- No. 6. A 5-ton crane car used for placing special trackwork.
- No. 7. Yard locomotive for shunting railroad cars loaded with sand, ballast, ties and other material.





Materials Handling Devices in the Shops of the Chicago Surface Lines

No. 1. Tray for carrying bearings and other material from the stock-room. The handle is removable, while the end is supported by a pedestal.

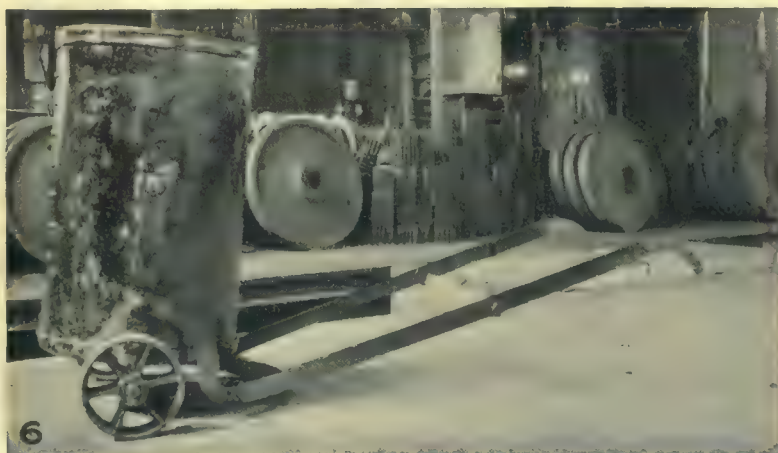
No. 2. Reels of trolley wire and feeder cable are unloaded with an electric hoist controlled by hand from the floor. The overhead track makes a complete loop in the stock room.

No. 3. Compressors to be overhauled are put on the work bench with a movable hand crane.

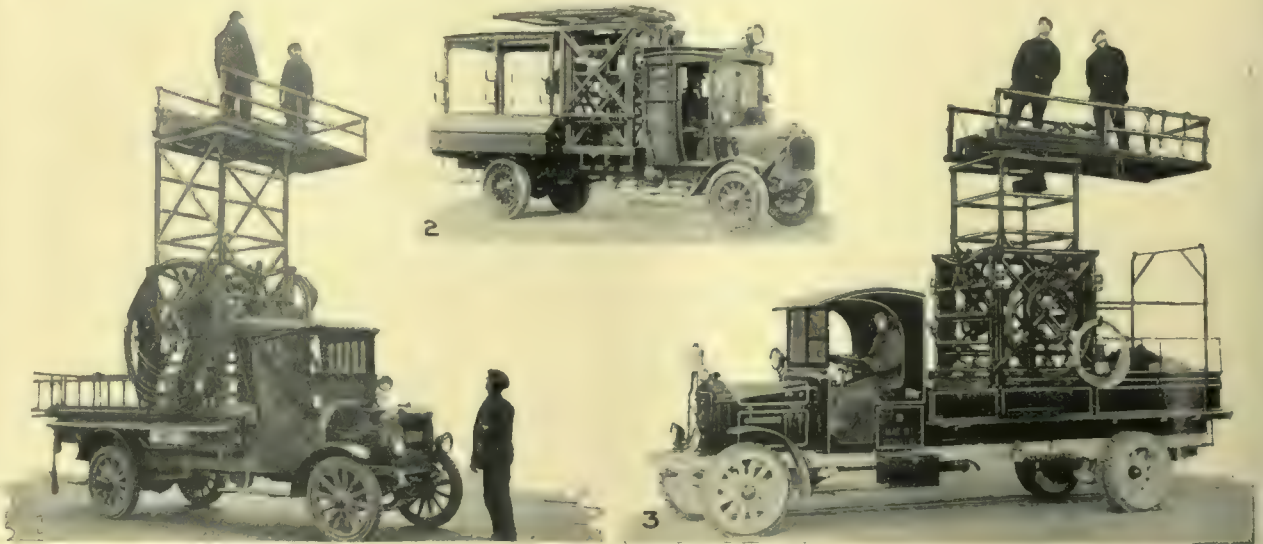
No. 4. The storage drums in the paint supply room are filled directly from the barrel which is hoisted with a 1-ton Yale spur-gear block running on an overhead track.

No. 5. A revolator for stacking rolls of paper in the storage room. This paper is used for printing transfers.

No. 6. Truck and removable swivel mounted can for handling heavy bulk material.



Ever-Ready Tower Trucks Reduce Maintenance Expense and Prevent Delays



- No. 1. A Federal tower truck in service on the Detroit United Railways.
- No. 2. Emergency wagon on Standard Motor Truck Company's truck chassis in use by the city of Detroit, department of street railways.
- No. 3. Philadelphia Rapid Transit Company's tower truck is built on a two-ton Pierce-Arrow chassis.
- No. 4. Specially constructed overhead repair tower wagon mounted on a two-and-a-half-ton Packard truck in service on the Chicago Surface Lines.
- No. 5. Overhead tower mounted on a Mack truck in service on the Chicago & Joliet Railway.
- No. 6. Three-and-one-half-ton White tower truck of the Public Service Railway, Newark, N. J.



Cranes and Conveyors Have Many Uses in Material Handling



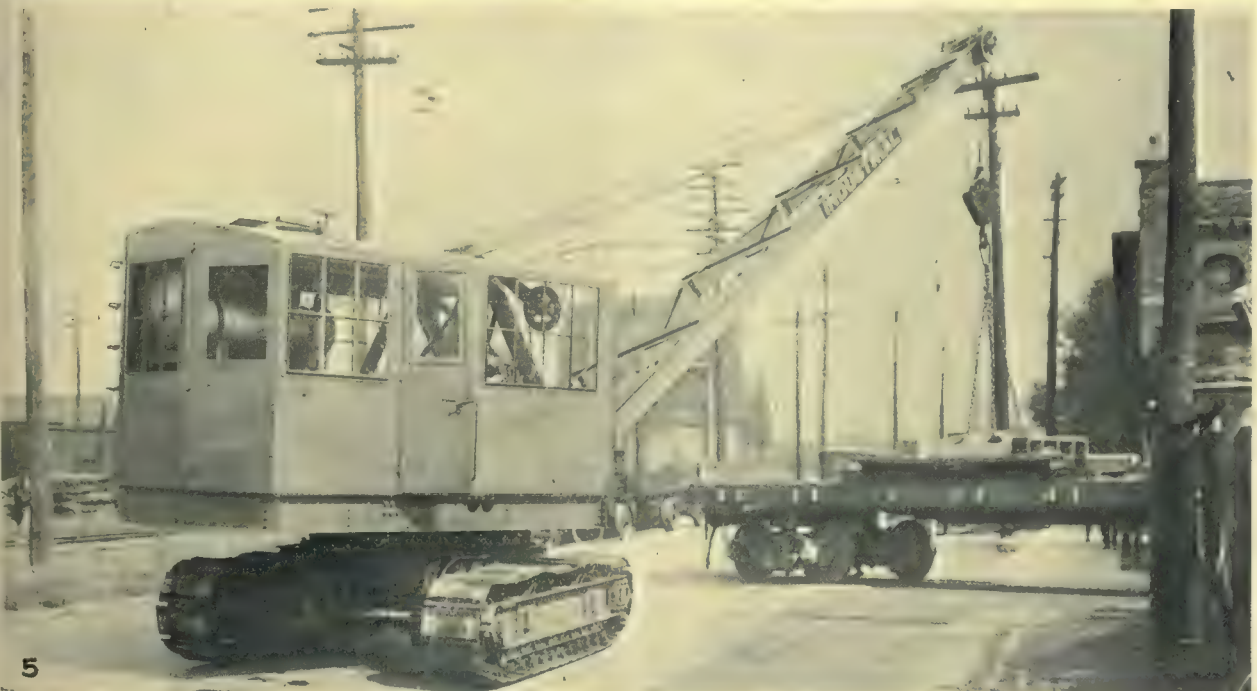
No. 1. Using a Mack truck for emergency handling of poles in Milwaukee. Temporary construction was removed when the job was complete.

No. 2. Loading coal directly from the pile by means of belt conveyors.

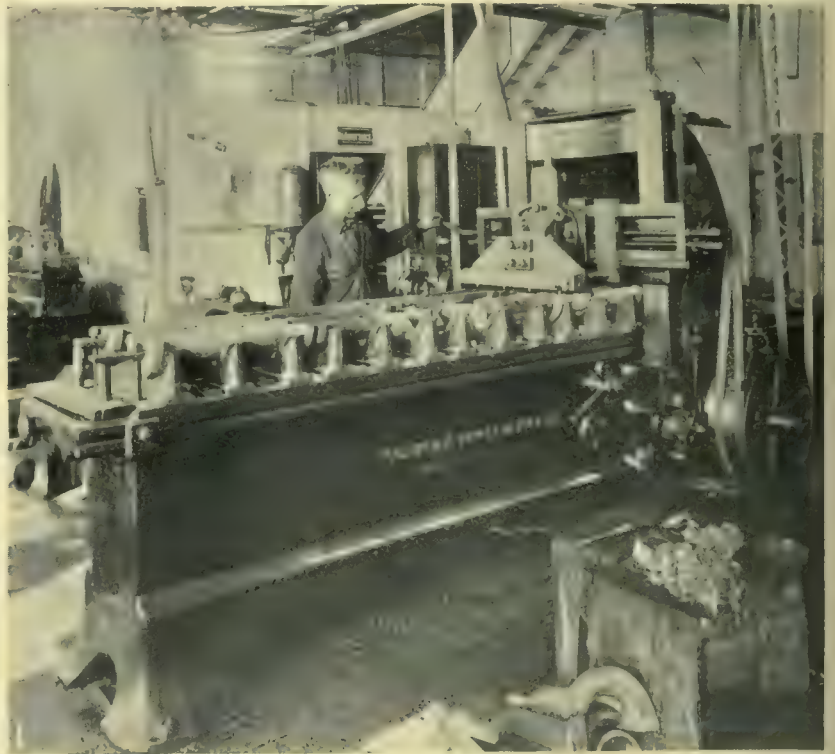
No. 3. Pole-digging and pole-setting equipment mounted on truck in use in California.

No. 4. Digging holes and setting poles with a caterpillar tractor equipment in Detroit.

No. 5. Crawling tractor with Industrial crane for handling heavy track materials.



Labor-Saving Methods and Equipment Serve All Departments



No. 1. Eighteen axle bearings finished at one time on this planer.

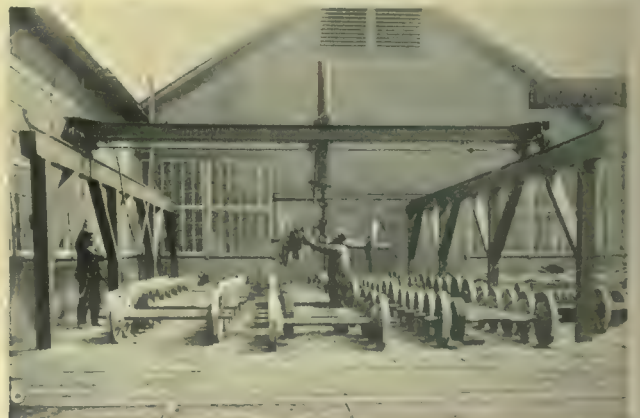
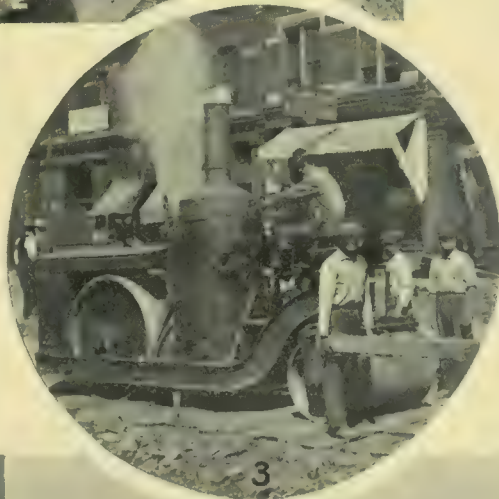
No. 2. Air tools and screw spikes save time in track reconstruction.

No. 3. The steam roller plays an important part in roadbed construction.

No. 4. Track repairs must be made frequently in close quarters.

No. 5. A chain hoist at the end of overhauling pits is a great convenience.

No. 6. Wheel and axle storage requires a traveling crane.

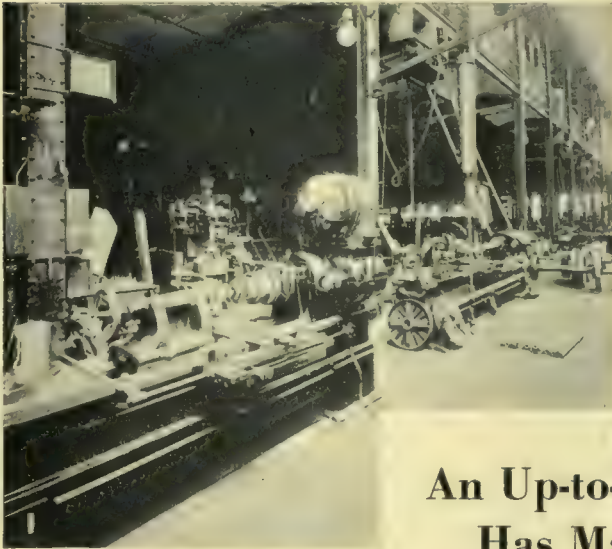




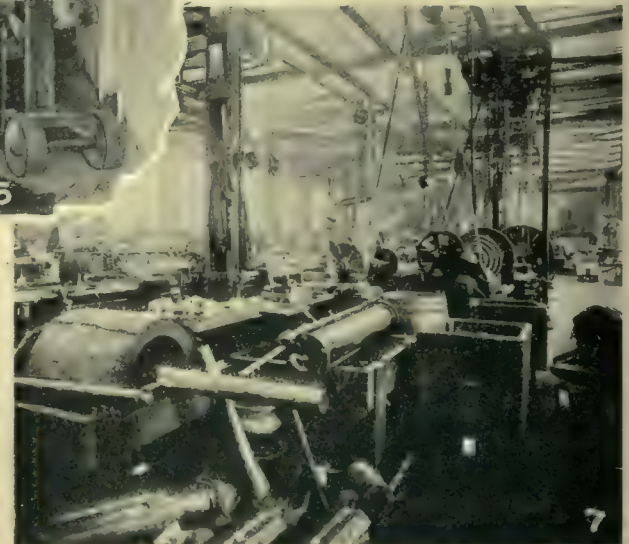
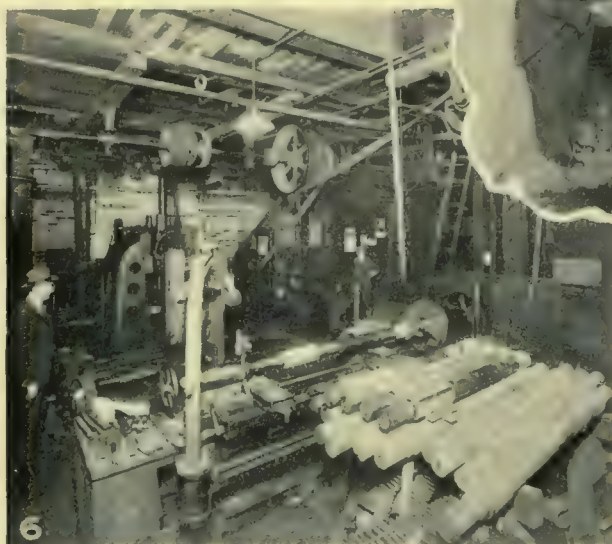
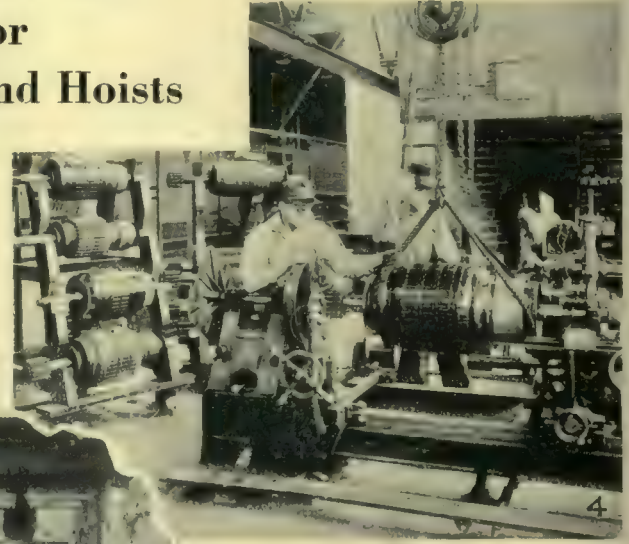
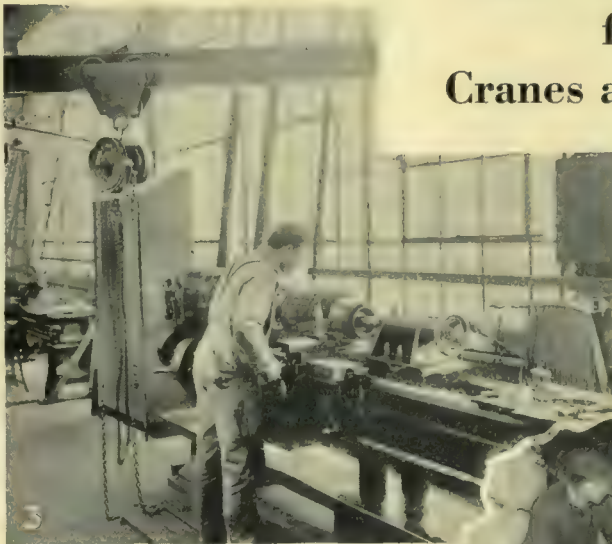
Track Materials Handling and Roadbed Construction in Pictures

- No. 1. Locomotive crane used by the Milwaukee Company for handling heavy parts in the storage yard and for duties anywhere on the property.
- No. 2. Handling ties in the storage yards at Saint Helena, Ore.
- No. 3. A concrete mixer in service during track construction.
- No. 4. An International crane on a Mack truck in service in Cleveland.





**An Up-to-Date Shop
Has Many Uses
for
Cranes and Hoists**



No. 1. An air hoist swung from a shop pillar serves two large lathes in the Vincennes Road shops of the Chicago Surface Lines.

No. 2. A portable crane and hoist in the Vincennes Road shops of the Chicago Surface Lines.

No. 3. Overhead traveling chain hoists

handle armatures to lathes in the Davenport shops of the Tri-City Railway & Light Company, Davenport, Iowa.

No. 4. An overhead traveling chain hoist handles armatures between racks and lathes in the shops of the Tri-City Railway & Light Company, Davenport, Iowa.

No. 5. A portable air hoist as a handy tool for pits.

No. 6. A hoist is swung from the back of this lathe in the South Side shops of the Chicago Elevated Lines.

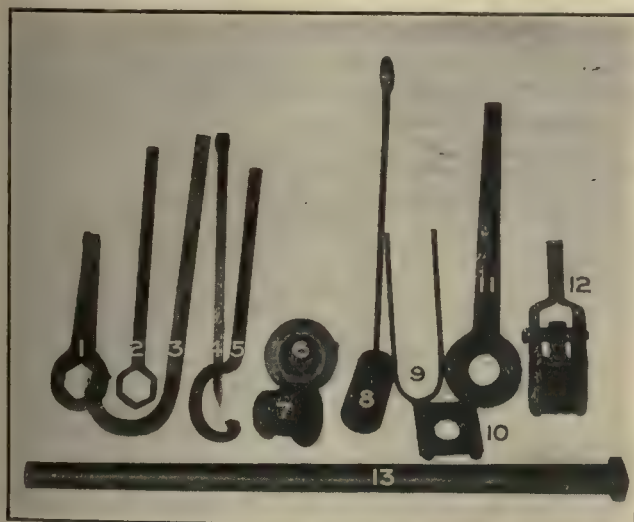
No. 7. A variety of hoists and cranes are used in the shops of the Philadelphia Rapid Transit Company.

Methods and Equipment for Doing Maintenance Work the Labor-Saving Way

Armature Dismantling Tools Reduce Labor Costs

Efficient Tools of Special Construction Enable Workmen to
Remove Parts Necessary in Overhauling Armatures
Without Danger of Damaging Detail Parts

ELECTRIC railway shops soon accumulate a large number of special tools for convenience in dismantling and assembling various pieces of equipment. The accompanying illustration shows some tools used by the Eighth Avenue Railroad, New York, for dismantling and assembling various armature parts. Tools Nos. 1, 2 and 3 are used for removing the pinion nut. The spanner, 3, has a projection at the end which fits into the tooth of the pinion so as to keep the armature shaft from rotating. Either of the wrenches 1 or 2 is used for unscrewing the nut; 4 is a coil lifter used in connection with the rewinding of armatures; 5 and 7 are used for removing the core nut. The dowels on the flanged end of 7 fit into the holes of the nut, and the projections on the sleeve portion are provided so that the spanner, 5, will fit over these conveniently and give sufficient leverage for unscrewing the nut; 6 is a jig used for redrilling the holes in the core nut. The tool 8 is used for swedging bushings on armature shafts, so as to provide for returning where they are worn below size. The tools Nos. 9, 10, 11, 12 and 13 are used for removing the commutator ring nut. The



SOME TOOLS USED FOR DISSEMBLING ARMATURE PARTS

wrench, 11, has projections which fit into the holes in the ring nut. No. 10 is a wooden clamp used to hold the wrench, 11, in position, and 9 is a U-shaped strap which fits over the end of the armature shaft and holds the armature down. The ratcheting device, 12, together with its handle, 13, is used for turning the armature, while the wrench, 11, holds the nut stationary. This

ratcheting device is constructed of an old pinion, the bore of which has been enlarged slightly so that it will slip over the shaft readily. The keyway in the pinion fits over the key of the armature shaft. The dog shown in the center of the ratcheting tool operates in the teeth of the pinion, so that by placing the long pipe handle, 13, on the end projection of 12, this can be ratcheted back and forth and the armature will be turned. As the commutator end nut is held stationary, this unscrews and is readily removed.

Signal Failures Still Decreasing in Chattanooga

A COMPARISON of signal failures for the Chattanooga Street Railway for the years 1919 and 1920 was given in last year's maintenance issue of the *ELECTRIC RAILWAY JOURNAL*, dated March, 19, 1921. Similar data for the year 1921 have now been made available through the annual report of the signal department. The accompanying table gives comparisons for the three years 1919, 1920 and 1921.

Trouble Found	1919	1920	1921
Line wires.....	8	13	5
Fuses blown.....	29	16	9
Lamps out.....	15	34	17
Relay trouble.....	24	22	13
Setting contactor.....	9	4	4
Restoring contactor.....	19	7	5
Bad grounds.....	9	7	6
Pole wiring.....	10	1	13
No trouble found.....	13	20	14
Miscellaneous.....	20	19	8
Totals.....	156	143	94
	1919	1920	1921
Total operations of all signals for year.....	1,745,950	1,709,820	1,759,300
Number of operations per failure.....	11,336	11,954	18,714
Average yearly operations of each block of signals..	96,986	85,490	97,964
Average daily operations of each block of signals per day.....	264	276	240
Number of blocks in service.....	18	20	20

The original signals were installed some thirteen years ago and have been almost completely rebuilt, part of them in the manufacturer's factory, but most of them on the railway company's property, some few not yet having been completely rebuilt. Twenty blocks of Nachod signals are now in operation. In the first part of the table a comparison of the different kinds of signal trouble is given. It will be noted that there were only thirteen relay troubles resulting from the use of forty relays over the whole of last year. This is equivalent to one relay failure in about three years, which speaks well both for the signal design and maintenance. It will be noted that there was a decrease in all troubles except the one classed as "pole wiring," and this increase was partly caused by a different way of classifying this. Formerly troubles on wires leading from the contactor were classed as "contactor troubles," but now they appear more properly under the head of "pole wiring."

The number of operations per failure was increased

during the year 1921 to 18,714, which is a 35 per cent advance over the past year and about as good as can be hoped for, considering the reconstructed signals and the age of the lines. (A signal operation is here counted as that produced by a car moving under a contactor.) With new equipment throughout, this record might be bettered. There were 4.7 failures due to all causes per block per year, or a failure every 77.6 days.

During the year the signal department of the railway installed two Cheatham automatic switches and went over all the lightning arresters on the railway system, putting them in the best condition possible. The grounds were made of larger capacity than formerly, and an additional 7-ft. length of galvanized pipe was driven at each arrester. Eighty-seven arresters were installed, making a total of 228. On Missionary Ridge an iron casting was buried for the ground of each arrester.

A Fleet of Overhead Repair Trucks

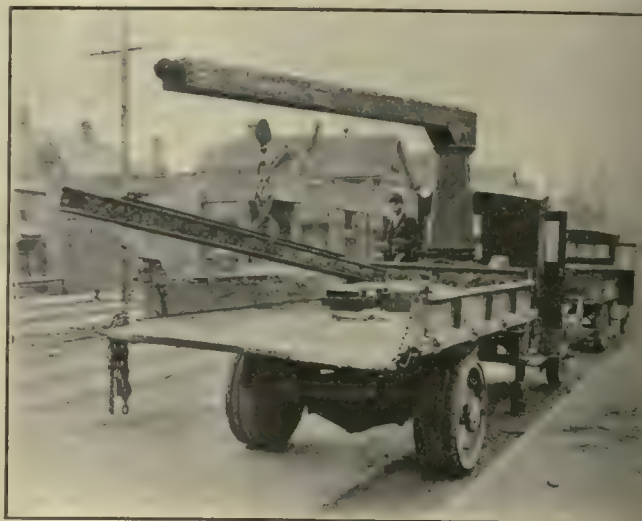
THE accompanying illustration shows a fleet of Packard chain-drive trucks equipped with overhead repair towers in service on the Third Avenue Railway System, New York. These towers are operated by hand



FLEET OF OVERHEAD REPAIR TOWERS

winch which elevate them approximately 20 ft. from the ground to the platform of the tower. The bodies are fitted with tool compartments, wire racks, etc., so that all necessary repair materials can be carried on the truck.

Handling Material with Truck Crane



CONVENIENT WAY DEPARTMENT CRANE TRUCK

THE Milwaukee Electric Railway & Light Company uses a Bay City heavy duty power crane mounted on a Packard truck for handling rails and other heavy railway material. The crane is operated by power taken from the trolley system and has a capacity of 6,000 lb. at 7½-ft. radius. The revolving of the crane base forward and reverse, the travel of the pulley block and lifting and lowering the pulley block are all controlled by shifting levers at the left of the driver's cab.

Tabulating Line Troubles

Memphis Keeps Comparative Records of Troubles Caused by Overhead Construction—Joint Use of Poles by the Utilities

ALL OVERHEAD line troubles are tabulated in Memphis so that the department of overhead lines can tell promptly and accurately exactly how much trouble each part of the overhead equipment has caused. This practice has been followed for a number of years, so that invaluable records have been obtained. The figures for 1919 and 1920 are given below. The corre-

THE MEMPHIS STREET RAILWAY
OVERHEAD LINE DEPARTMENT
Annual Report of Emergency Calls
1919

	Trolley Breaks	Trolley Hangers	Trolley Ears	Trolley Frogs	Trolley Sleeves	Spans	Pull Overs	Guy	Strains	Lig. Arresters	Light Circuits	Electric Switches	Poles and Fixtures	Miscellaneous	Total
January	3	17	3	0	0	1	6	2	0	1	1	3	1	8	46
February	5	6	5	0	0	1	3	2	0	0	0	3	1	10	36
March	5	10	6	1	0	6	4	1	1	0	6	3	1	10	54
April	1	17	4	0	0	2	0	1	2	0	6	9	2	5	49
May	4	13	7	0	0	4	7	2	1	1	2	8	3	8	60
June	1	25	0	0	0	6	4	5	3	0	10	5	0	12	79
Total for year	19	88	33	1	0	23	23	11	7	2	26	31	8	53	324
Same period last year	35	49	49	5	0	18	4	6	9	1	39	45	6	54	320
July	6	12	10	0	0	5	3	2	0	0	4	7	0	17	66
August	4	7	5	0	0	2	4	0	0	0	4	5	1	3	30
September	5	25	11	1	0	3	8	7	3	0	9	7	1	16	96
October	4	8	1	0	1	2	5	0	0	2	8	1	4	4	44
November	4	25	11	1	0	3	8	7	3	0	9	7	1	16	96
December	3	13	3	0	0	6	4	5	3	0	10	5	0	12	79
Total for year	27	77	41	2	0	19	24	18	3	0	28	36	5	64	344
Same period last year	22	73	19	2	0	10	22	8	1	3	17	21	2	47	247
Total for year	46	165	74	3	0	41	47	29	10	2	54	67	13	117	668
Total last year	57	122	68	7	0	28	26	14	10	4	56	66	8	101	567
Increase or decrease	71	43	6	4	0	13	21	15	0	2	2	1	5	16	101

THE MEMPHIS STREET RAILWAY
OVERHEAD LINE DEPARTMENT
Annual Report of Emergency Calls
1920

	Trolley Breaks	Trolley Hangers	Trolley Ears	Trolley Frogs	Trolley Sleeves	Spans	Pull Overs	Gays	Strains	Lig. Arresters	Light Circuits	Electric Switches	Poles and Fixtures	Miscellaneous	Total
January	5	14	3	0	4	1	3	3	0	7	5	0	7	58	
February	5	1	8	0	0	4	2	1	1	0	2	3	0	7	37
March	7	6	4	0	0	4	6	2	1	0	2	3	2	18	60
April	2	10	8	1	0	5	4	1	1	0	3	5	1	8	49
May	24	19	0	0	5	4	5	2	0	5	8	4	14	90	
June	3	24	17	0	0	4	3	1	3	1	2	7	2	6	73
Total for year	22	79	64	1	0	26	20	13	11	1	24	36	9	50	367
Same period last year	19	88	33	1	0	22	23	11	7	2	26	31	8	53	324
July	5	17	17	0	0	4	5	5	2	0	4	6	1	12	78
August	11	17	9	0	0	7	5	2	0	0	2	10	5	17	73
September	3	9	14	1	0	10	10	2	1	0	1	12	2	17	82
October	10	5	14	0	0	3	2	2	1	0	1	17	5	12	73
November	9	6	9	0	0	2	6	4	1	1	5	13	2	10	68
December	2	4	2	0	0	4	3	7	0	14	10	1	12	63	
Total for year	40	58	65	1	0	30	31	22	6	1	27	68	15	68	433
Same period last year	27	77	41	2	0	19	24	18	3	0	28	36	5	64	344
Total for year	62	137	129	3	0	56	51	35	17	2	51	104	25	118	800
Total last year	46	165	74	3	0	41	47	29	10	2	54	67	13	117	668
Increase or decrease	16	28	55	0	0	15	4	6	7	0	37	12	12	132	

The Memphis Street Railway Company
OVERHEAD LINE DEPARTMENT
EMERGENCY REPORT

Date Jan 14 1922

LINE Jefferson St ON (Inbound/Outbound) TRACK

LOCATION Jefferson & Main

TROUBLE REPORTED Trolley jumping

REPORTED BY Wilkinson TIME 11:30 A.M./P.M.

BY J. Tarr

REPORT OF EMERGENCY CREW

TROUBLE FOUND Frog out of line

CAUSE OF TROUBLE _____

LOCATION Main and Jefferson ON (Inbound/Outbound) TRACK

WORK DONE Lining up frog

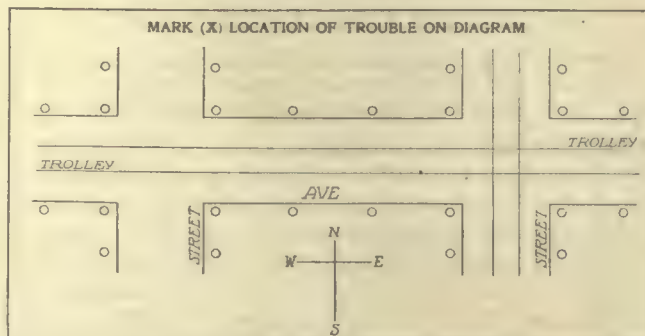
MATERIAL USED 25 ft. 1/2" galvanized iron wire

LINE OPEN 12:30 A.M./P.M. TIME REPAIRS COMPLETED 2:00 A.M./P.M.

REMARKS _____

atkins FOREMAN

NOTE:—EMERGENCY CREW WILL MARK LOCATION OF TROUBLE ON DIAGRAM ON REVERSE SIDE OF THIS REPORT



REVERSE SIDE OF LINE DEPARTMENT REPORT

upper part of the accompanying blank. On the lower part of the blank the foreman reports how and when he cared for the trouble, the material used and the time taken to make the repair. On the back of this report is space to enter on a printed diagram, if desired, the location of the trouble. From these reports a monthly table, by days, is prepared. The upper part of the blank used for this purpose is shown.

THE MEMPHIS STREET RAILWAY
Monthly Report of Emergency Calls

MONTH OF 192

Date	Trolley Breaks	Trolley Hangers	Trolley Ears	Trolley Frogs	Trolley Sleeves	Spans	Pull Overs	Guy	Strains	Lik Arresters	Light Circuits	Electric Switches	Poles and Fixtures	Miscellaneous	Total
1															
2															
3															
4															
5															
6															
7															

FORM OF DAILY REPORT

sponding figures for 1921 are given at the foot of this column. Decreases are shown by italics.

These tables are made up from daily reports and these in turn from the reports made by the emergency crews to the overhead line department. When repairs are made a typical case will be followed out.

A report is received by telephone from a transportation department inspector that trolleys jump at the corner of Jefferson and Main Streets on the Jefferson Street line, outbound track. This is recorded on the

THE MEMPHIS STREET RAILWAY
OVERHEAD LINE DEPARTMENT
Annual Report of Emergency Calls
1921

	Trolley Breaks	Trolley Hangers	Trolley Ears	Trolley Frogs	Trolley Sleeves	Spans	Pull Overs	Guy	Strains	Lik Arresters	Light Circuits	Electric Switches	Poles and Fixtures	Miscellaneous	Total
January	4	4	5	0	4	8	2	0	0	0	4	0	0	7	46
February	4	5	4	0	1	3	1	0	0	0	4	11	0	9	46
March	1	1	4	0	2	6	4	2	0	0	8	8	2	3	58
April	3	10	2	0	8	7	3	0	0	0	6	9	1	5	51
May	3	12	10	0	4	3	2	0	0	0	9	1	12	62	62
June	2	7	7	0	8	7	2	0	0	0	1	4	6	10	55
Total for year	17	50	32	0	32	34	14	2	0	33	44	12	55	325	325
Same period last year	22	79	64	2	26	20	13	11	1	24	36	9	60	367	367
July	6	9	10	0	5	6	2	1	0	3	6	2	11	62	62
August	3	5	5	0	11	4	3	2	0	4	6	3	10	58	58
September	6	1	4	0	3	2	4	0	0	0	4	2	9	41	41
October	1	3	6	0	4	1	4	1	0	10	5	1	14	50	50
November	2	8	2	0	3	1	1	1	0	9	2	1	7	37	37
December	1	10	2	1	0	2	4	0	1	8	5	0	4	38	38
Total for year	19	36	29	1	0	29	18	15	7	40	28	9	55	286	286
Same period last year	40	58	65	1	0	30	31	22	6	1	27	68	16	433	433
Total for year	36	86	61	1	0	61	52	29	9	73	72	21	110	611	611
Total last year	62	137	129	3	0	56	51	35	17	2	51	104	25	128	800
Increase or decrease	26	51	68	2	0	55	1	6	8	2	22	12	44	18	189

The headquarters of the overhead line department are at the main carhouse on Beale Avenue, and it is here that the emergency line crews are stationed.

JOINT USE OF POLES

For some fourteen years the utilities in Memphis have joined in the use of poles to a considerable extent. It is the practice to carry on one side of the street the power cables and the railway feeders, the former over the latter and both above the span connection. On the other side of the street are the telephone wires and telegraph wires. Each company naturally cares for repairs and renewals of its own equipment, but they join in the renewal of poles.

The practice in this respect is for the line department in each company to make a joint inspection in the early spring to determine which poles need replacement, then to divide between the several companies the number of poles to be replaced. An effort is made in this division to assign the poles to be replaced in one part of the city to one company; those in another part of the city to the second company, etc. In this way construction costs are reduced. Each company naturally transfers its own attachments from the old pole to the new.

Handling Cars Inside Shops

For Cars Not Equipped with Trolleys Some Form of Overhead Trolley System Is Quite Necessary to Safeguard Employees from Accident

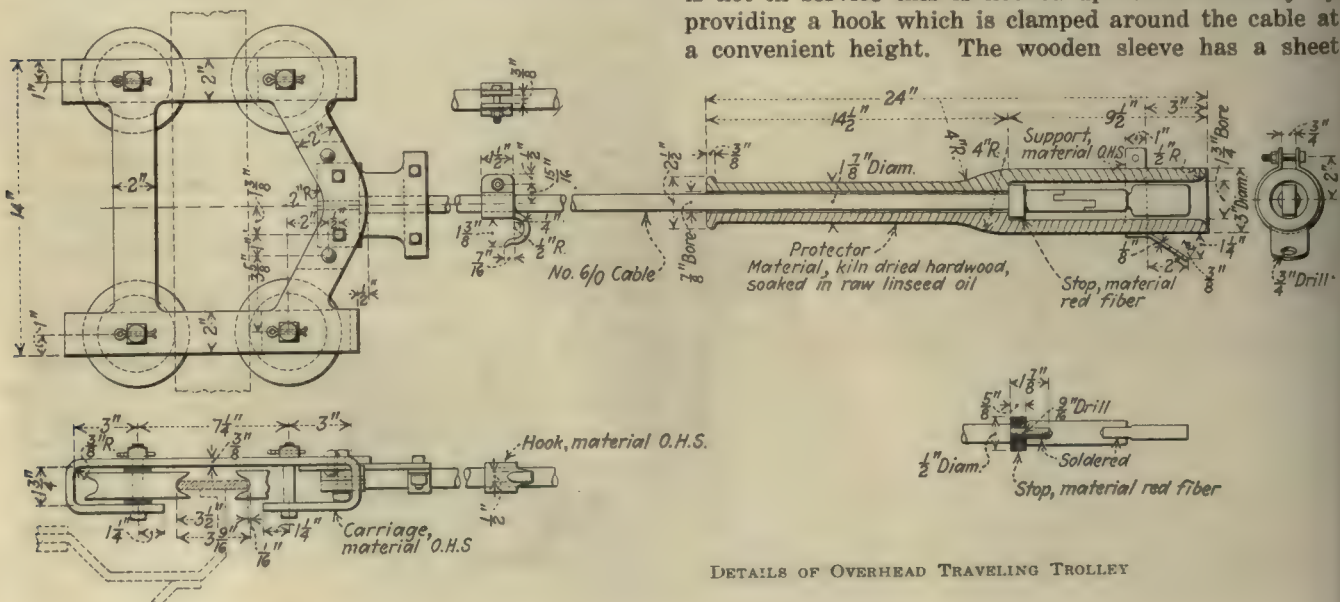
ELECTRIC railways using the third-rail contact system have a somewhat inconvenient problem to solve to provide for shifting equipment inside the shop. The third rail installed in such places is a continual source of danger to workmen and the use of switching locomotives or working cars equipped with trolleys for moving cars is a great inconvenience as well as being costly. On some systems the third rail is laid in the yard up to the entrance of the shop, and no contact system is provided inside the buildings themselves. In placing a car or train over the pits it is the practice to get up sufficient speed on entering so as to be able to coast into position. In removing cars at such shops it is a common practice to use a long jumper which can be held on the third rail outside the shop while the other end is held on the contact shoe of the car to be moved, or where train operation is used the head car of the train is used with the jumper to pull out the remainder of the train. This system, however, has an element of danger in that proper care is not always exercised by workmen in attaching the contact to the third rail or in holding the other end on the contact shoe of the car to be moved. Serious burning and flashing of the employees have resulted in many cases. Where shops are long this method cannot be used, as it is frequently necessary to move a car at the back of the shop, and in this case an exceedingly long jumper would be necessary.

Accompanying illustrations show a form of overhead traveling trolley used by the Brooklyn Rapid Transit Company in its shops. This employs an overhead iron framework, insulated, so that this forms the source of power. A carriage with four contact wheels runs along this contact system with a flexible cable and protected contact on the end of sufficient length to reach to the contact shoes of the cars to be moved. The framework of the carriage is constructed of $\frac{3}{8}$ -in. strap iron with a terminal and clamp at the bottom to receive and hold the cable. A well-insulated cable of flexible construction is used for conducting the current. In addition to the rubber insulation either a double or triple braid is quite essential to insure long life and prevent injury.



OVERHEAD TRAVELING TROLLEY SYSTEM IN BROOKLYN RAPID TRANSIT COMPANY'S SHOPS

The bottom contact is connected to the cable through a standard knuckle joint connector so that this can be replaced or renewed whenever necessary. As a protection for this bottom contact a wooden sleeve is used. This is made of kiln-dried hardwood, which has been soaked in raw linseed oil. The upper end of this is provided with a hole to receive the cable and the bottom end is enlarged so as to receive the terminal and knuckle joint connector. A stop of red fiber fits over the end of the cable just above the knuckle joint connector and prevents the wooden sleeve from dropping off. When hanging down this protects all parts of the contact and when making contact with the third rail shoe on the car to be moved this slips up on the cable so as to expose the lower end of the contact. The workman is thus effectively protected at all times and there is no danger of his coming in contact with live parts. When the contact is not in service this is hooked up out of the way by providing a hook which is clamped around the cable at a convenient height. The wooden sleeve has a sheet

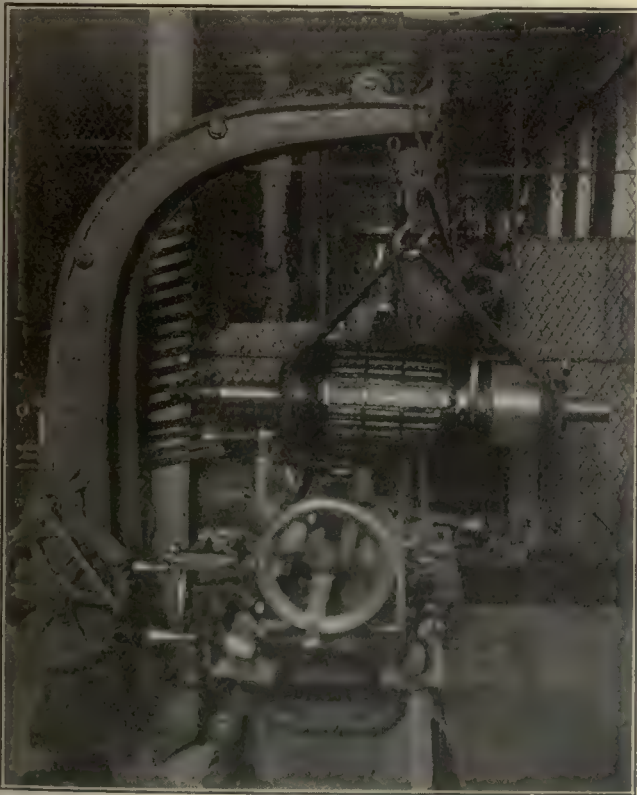


DETAILS OF OVERHEAD TRAVELING TROLLEY

steel clamp with a hole so as to fit over the hook on the cable. Details of construction of the carriage, the cable and the bottom protection are shown in one of the accompanying illustrations. Another shows its use in one of the shops of the Brooklyn Rapid Transit Company.

Serving Shop Machines with a Portable Crane

IN SHOPS which have line shafting and belts it is often very difficult to provide overhead traveling trolleys or cranes for handling heavy work in and out of the various shop machines. Even where other material handling equipment is available, a portable crane will be found a great labor and time saving piece of equipment. The accompanying illustration shows a Canton Foundry & Machine Company's No. 3 portable floor crane and hoist serving a lathe in the shop of the Eighth Avenue Railroad, New York City. One man and this type of crane handle the job of putting an armature in position for turning the commutator with perfect ease. This crane serves the larger machine tools, such as drill press, boring mill and lathe, and handles the heavier equipment parts such as armatures, motor shells, truck frames and the like. With the older hand method of lifting these parts from three to six men were necessary, so that often high-priced machinists were taken from their work to help in a tiring and unattractive operation. If a saving of 75 cents per day results in labor from the use of such a portable crane, this would amount to \$19.50 each month of twenty-six days, or



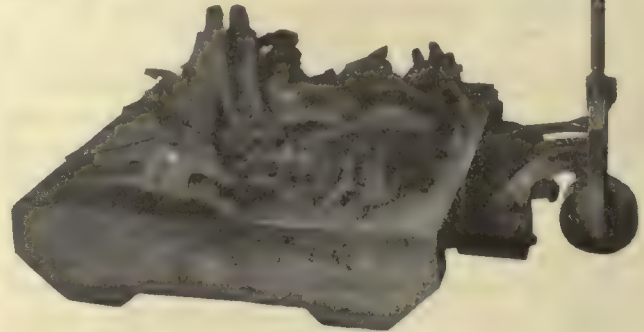
HANDLING A RAILWAY ARMATURE WITH PORTABLE FLOOR CRANE

\$234 per year. In addition to this saving there would also be a loss of production with different machines standing idle while their operators are assisting in lifting a piece of apparatus.

The crane shown has a total height of 7 ft. 6 in., a lift of 6 ft. 4 in. and a lifting capacity of 5,000 lb.

Lift Trucks Are Handy Equipment for Railway Shops

THE accompanying illustration shows a lift truck in the shops of the Eighth Avenue Railroad, New York City. This is used for handling and transporting all kinds of electric railway material throughout the shop and in the storeroom. Skids of suitable height so that the trucks can be run underneath are used. The accompanying illustration shows a quantity of brakeshoe heads being transported on a skid, parts of which are to be built up by welding. There are many types of these hand-lift trucks on the market. The particular one shown in this illustration raises the platform by means of a hydraulic

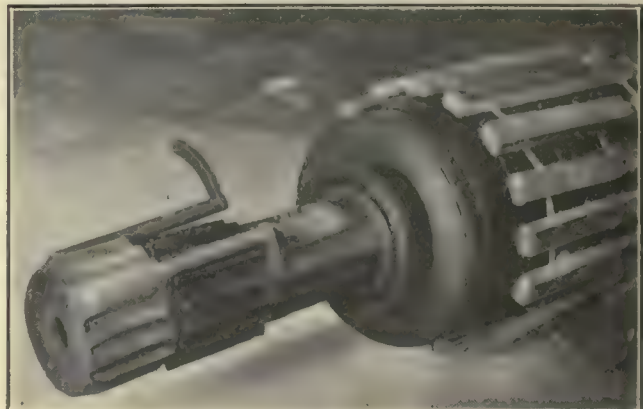


LIFT TRUCK IN SHOP SERVICE

cylinder. The lifting is accomplished by moving the handle backward and forward. When not in use, the handle is held by a catch in the upright position so that it cannot drop to the floor and is always in easy reach of the operator. The truck can be moved and steered with the handle in the upright position if found necessary in close quarters. Different heights of lift are available as are found necessary to clear different shop obstructions. The pressing of a pedal operates a hydraulic release and lets the load settle gently to the floor. The handle does not engage the angle iron frame, so that when the load is released there is no tendency for the handle to fly up and injure the operator.

Tool for Making Pinion Installation a One-Man Job

SOMETIMES shop operations which ordinarily require the services of two or more men can be readily carried out by a single worker by the aid of a few inexpensive special tools. In installing pinions on an armature shaft it is usually necessary to use a sledge and



THIS DEVICE ENABLES ONE MAN TO INSTALL PINION

block to force the pinion into position, even though it has been previously heated so that it will go on without difficulty. The usual method would require the services of two men, one to swing the sledge and the other to hold something against the end of the pinion so as to prevent injury. The accompanying illustration shows a simple device used by the Eighth Avenue Railroad, New York, N. Y., which enables this operation to be done by one man. The device is made from an obsolete pinion and has two round prongs which extend inward and fit into the teeth of the pinion which is being installed. At the inside end of these rods are two dogs which drop into position around the shaft and hold the tool firmly so that it will not fall off even though a glancing blow is struck. The rods are welded to the face of the old pinion and the bore has been enlarged sufficiently so that it will go around the shaft without difficulty.

Why Old Railroad Ties Are Burned

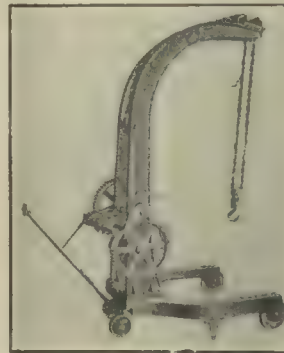
THE question as to why worn-out crossties are burned by railroads instead of allowing people to take them for fuel has been answered by Samuel Porcher, general purchasing agent of the Pennsylvania Railroad, in which he states that efforts have been made to interest dealers in firewood in buying the old ties, but thus far without much success. The causes appear to be that the old ties are often dirty; that they contain stone, grit and slag wedged in the cracks which might injure the saws used in cutting them; that in many cases they are partly decayed; that they are dried out and that their fiber is more or less crushed, so that they burn out quickly. For these reasons dealers have been unwilling to pay the railroad company enough to cover the cost of collecting the ties and delivering them to a point at which they could be removed.

Efforts have also been made to dispose of old ties in such ways as for wood pulp purposes, for extraction of chemicals, for burning and sale of the ashes for fertilizer, and for manufacture into charcoal, but without success.

Some ties have been sold to purchasers living on or near the right of way who buy them at nominal prices, usually at from 10 to 15 cents apiece. Such means of disposal is practicable only where the ties can be delivered at a public crossing or other points so that they can be obtained safely by the user and where the cost of delivering them is not greater than the nominal prices

obtainable. The company feels that it cannot allow the public to go promiscuously over its tracks and through the yards to gather up old ties, as this would be practically letting down the bars against trespassing on the tracks, an evil against which the Pennsylvania Railroad has struggled for years and which has been the cause of about half of the fatal accidents on railroads in the United States.

Back-Geared Portable Crane and Hoist



DOUBLE GEARED PORTABLE CRANE AND HOIST

FOR handling loads in excess of 4,000 lb., the Canton Foundry & Machine Company, Canton, Ohio, have recently brought out a double-geared portable crane and hoist. As both shafts are squared to receive the lifting cranks, the load can be lifted on either the single or the back gear. When handling light work and where speed is desirable, lifting should be done on the single gear, but when ease of operation is desired

with heavier loads, the double gear should be used for lifting. The various sizes manufactured can be furnished with this additional equipment.

Light-Weight Trucks Prove a Convenient Electric Railway Accessory

ACCOMPANYING illustrations show two light-weight trucks constructed on Ford chassis by the Second Avenue Railroad, New York, N. Y. Truck No. 4 was built essentially for transporting tools used by the electrical department while making repairs in the underground conduit system. There are four brackets on each side of the car body which are used for carrying channel rails. Convenient bins and tool boxes are provided along the sides and back of the driver's cab which can be locked. The tops of the bins have flat covers which are used for seats and the pipe railing along the sides are found very convenient.

The No. 5 truck, also built in the shops of the company, on a Ford chassis is a dump truck. This is convenient for cleaning out the underground conduit slot.



AT LEFT, TRUCK USED BY THE ELECTRICAL DEPARTMENT. AT RIGHT, DUMP TRUCK USED FOR CLEANING OUT UNDERGROUND SLOT

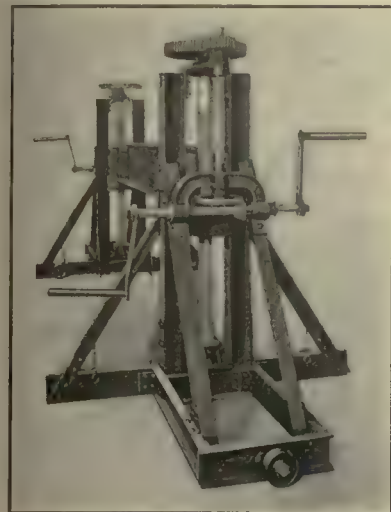
What's New from the Manufacturers

A Portable Hoist for Shop Use

A TYPE of portable shop hoist has been placed on the market by Fox Brothers & Company, New York City, for use in shops which are not fitted with overhead traveling crane equipment or in places which are inaccessible to cranes,

or for use while cranes are in use handling other parts.

A complete equipment consists of four separate jacks and two cross girders. Each jack is mounted on cast-iron wheels with flat treads so that they can be moved from place to place with little effort. These wheels revolve on shafts attached to eccentric bearings, held in place by pins. When the jacks are in position



PORTABLE SHOP HOIST FOR RAISING CARS

from the bearings, allowing the wheels to rise and the entire base of the jack to rest on the shop floor. The framework is constructed of structural steel shapes and the members are strongly riveted together with gusset plates. Each jack is operated by a pair of handles which turn a shaft on which is mounted a miter gear, which transfers power to a bevel-gear shaft, at the upper end of which is attached a pinion meshing with a large spur gear keyed to the main screw. When this screw

is revolved it raises and lowers the nut or raising block. When the hoist is in its lowered position the cross girders are 2 ft. 8 in. from the floor level. They can be raised to the extreme height of 6 ft. 3 in., giving a total movement of 3 ft. 7 in. The working capacity is 30 tons.

Convenient Truck for Way Department

A RECENT type of truck for road building has been placed on the market by the Four Wheel Drive Auto Company of Clintonville, Wis. This type of truck has an extremely short wheelbase of 105 in., which gives it an exceptionally short turning radius—sometimes very essential on work of electric railways. This truck is designed to carry a three-batch load of 3 tons capacity. The body is operated by a horizontal hydraulic hoist and the tail gates can be opened individually. The truck is also designed to be used as a tractor for trailing loads to the concrete mixers and for hauling road machinery. Some of the governing dimensions are given in the accompanying table.

DIMENSIONS AND CAPACITY OF TRUCK FOR ROAD CONSTRUCTION

Capacity.....	6,000 lb.
Allowance for body and hoist.....	2,400 lb.
Weight of chassis with pressed-on tires.....	6,175 lb.
Wheel base.....	105 in.
Tread, front and rear.....	60 in.
Turning radius.....	20 ft. 6 in.
Speed.....	15 m.p.h.
Wheels and tires.....	36 in. x 7 in. front 46 in. x 8 in. rear
Clearance under lowest part of axle.....	9 11 16 in.
Clearance under transmission.....	15 in.
Length of frame.....	166 in.
Total over-all length of car including starting crank.....	181 in.
Width of frame.....	36 in.
Total width of chassis over hub cap.....	74 1/2 in.
Capacity of gasoline tank.....	20 gal.
Motor.....	Wisconsin, 4-cycle, 4-cylinder, 4 1/2 in. bore, 5 1/2 in. stroke

Three speeds forward and one reverse are provided. Beginning with the transmission the speed is gradually reduced. The transmission has a reduction of 4 to 1 low speed, 2 to 1 second speed, 4.13 to 1 reverse speed and a direct speed of 1 to 1 on high. The second reduction of speed is made in the sub-transmission of a silent gear drive, having a driving pinion with fifteen teeth and a driven pinion containing the center differential of thirty-one teeth, making a reduction of 2.06 to 1. The third and final reduction is made on a differential of the rear and front axles, having a reduction of 4.30



AT LEFT, SIDE VIEW OF TRUCK FOR ROAD CONSTRUCTION. AT RIGHT, BODY HOISTED TO DISCHARGE POSITION

to 1, making the total reduction as follows: 35.6 to 1 on low speed, 17.8 to 1 on second speed, 36.7 to 1 on reverse speed, and 8.9 to 1 on high speed.

The springs are made of alloy steel, semi-elliptic front and platform spring rear. The drive is taken through the springs. Torsion rods are provided to take up the torque of the axles.

New Conveyor a Labor Saver

A NEW type of portable self-propelled belt conveyor has recently been placed on the market by the Barber-Greene Company, Aurora, Ill. It is called the B-G U-Belt Loader and its new features include self-feeding, self-propelling and one-man control. It is being furnished in two sizes, with 12-in. and 18-in. U belts. The 12-in. model has a capacity of 50 tons of coal per hour, or 70 tons of sand and gravel per hour. The 18-in. model has a capacity of 75 tons of coal per hour, or 100 tons of sand and gravel per hour. Either



LOADING COAL FROM A PILE INTO A WAGON

gasoline motor or electric motor drive is furnished as desired. The belt consists of a special four-ply, $\frac{1}{8}$ -in. rubber-covered belt, flanged on the side with steel overlapping clips and cupped flights across the belt every 18 in. Cast-iron shoes support the belt on its return. An adjustable spout is furnished with each machine and a wire dust screen, with mesh to suit conditions, is furnished as an extra.

This is essentially a one-man machine, and a single operator can load trucks or wagons and transport the machine from one location to another. One man can load mine-run Pocahontas coal from a storage pile into a truck or wagon at the rate of 5 tons in seven minutes.

Trolley Wheel with Stationary Guide Flanges



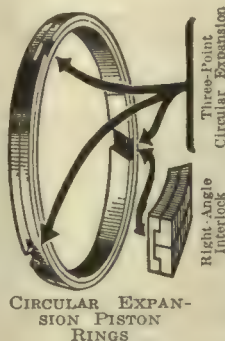
TROLLEY WHEEL WITH STATIONARY FLANGES

THE H. H. Trolley Supply Company, Cleveland, Ohio, has recently brought out a new type of trolley wheel with steel guide flanges on the outside which prevent fouling on wires. It is claimed that much of the trouble from wheels leaving the wire is due to a tendency for them to roll off and that the stationary guide flanges assist the wheel in maintaining its grip upon the wire.

The two guide flanges are made from cold-rolled steel stampings, which are re-treated to prevent wearing of the sides of the trolley

wire. These flanges are interchangeable, giving eight different wearing positions. In the construction of the rotating parts, especial care is taken to insure proper balance and true rotation of the wheel upon its axis.

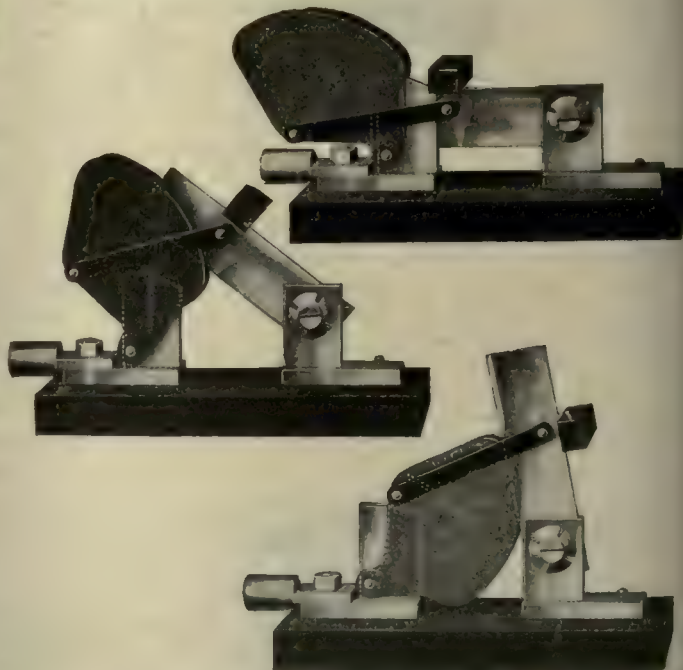
New Piston Packing Ring



THE accompanying illustration shows the details of construction of the Zelnicker Ever-Tyte Piston Ring. The type of construction provides for a three-point expansion and a right-angle interlock to insure tightness. The manufacturers claim that the use of these rings makes the reboring of round cylinders unnecessary. These piston rings are furnished by the Walter A. Zelnicker Supply Company, St. Louis, Mo.

600-Volt Switches with Protecting Barriers

ACCOMPANYING illustrations show the Snuf-arc type of 600-volt knife switch being introduced by the Trumbull Electric Manufacturing Company, Plainville, Conn. This switch is of the usual construction except that it has a swinging molded barrier on each of the contact jaw posts. This hinged barrier is operated by an insulated connecting rod attached to each blade in such a way that when the blade leaves the jaw posts



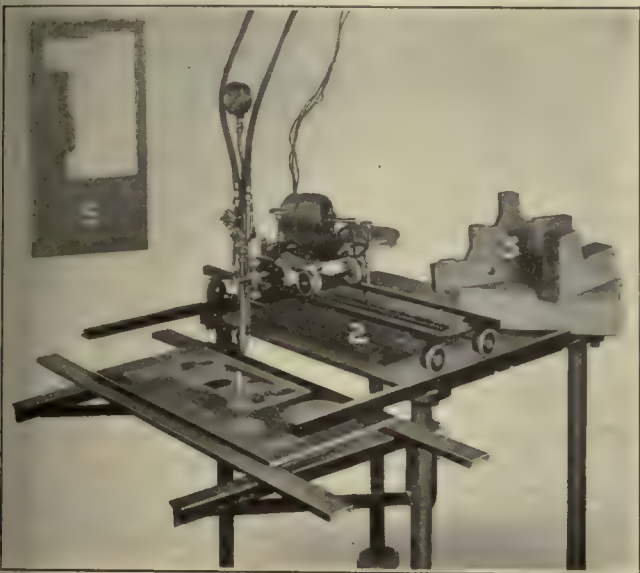
OPERATION OF MOLDED BARRIER FOR SWITCHES. TOP, BLADE IN CONTACT. CENTER, BLADE BREAKING CONTACT. BOTTOM, CIRCUIT OPEN

the barrier swings between the breaking points. The arc is thus effectively extinguished without danger of side flare.

The barriers used are substantially made of fireproof insulating material molded into one piece. A heavy center piece swings closely over the contact jaw post, and two wide flat side sections inclose each side of the jaw post and the end of the blade. The center piece stretches and breaks the arc, while the side sections prevent the side flare and the spreading of the arc to adjoining posts or to the sides of the inclosing cabinets.

New Automatic Torch Cutting Machine

THE General Welding & Equipment Company, Boston, Mass., is marketing a new automatic gas torch cutting machine. The equipment is mounted on two carriages, the upper one having four wheels running on a track and the lower carriage also having four wheels running on a track at right angles to the upper one. The operation of the two carriages is similar to that of a traveling crane, and with the gas torch mounted on the upper carriage it will cover any point in a horizontal plane within the capacity of the machine. The cutting torch is mounted on one side of the upper



AUTOMATIC GAS TORCH CUTTING MACHINE

1—Steel plate with various shapes cut out. 2—Fiber template with pattern for No. 1. 3—Die for trimming crankshafts. 4—Part of trimming die cut out of 2-in. armor plate. 5—Steel plate showing trimming die cut out.

carriage with a torch adjuster, while on the opposite side is mounted the driving and tracing system. As the torch and tracing mechanism are mounted on the same carriage, they are rigidly connected.

The driving and tracing mechanism is carried by a shaft which causes the cutting parts to follow a definite path. The shaft is provided with four driving pins which follow in slots of the driving members slipped loosely over the shaft. The driving member rests on the inclined edge of the template partly through its own weight and with the additional pressure of an adjustable spring. The conical end is knurled and hardened so as to insure a reliable frictional driving engagement with the inclined face. The shaft also carries the small, highly-polished tracing roller, slipped loosely over a small pin at the lower end of the shaft. This roller fits loosely in the polished groove of the lower part of the template.

When the shaft is rotated, the driving member will run along the inclined face of the template, pressing at the same time the polished tracer roller against the polished face of the groove. The driving member and tracing roller are thus kept in constant engagement with their respective template faces, which insures uniform speed. The speed can be regulated either electrically by a rheostat or mechanically by changing the position on a friction wheel on a friction disk or by both.

Among the advantages claimed for the mechanical drive are that all possible irregularities and vibrations of the driving member are up and down and cannot

affect the smooth running of the tracer and the machine, which operates in another plane and is guided by a polished tracer, pressed on a polished face. A smooth and uniform movement is thus obtained which enables the cutting torch to produce smooth and accurate cuts. The equipment is being furnished in two standard sizes with cutting ranges of 12 in. x 12 in. and 24 in. x 24 in.

Unique Application of Electric Traveling Crane

A RATHER unusual application of a traveling crane as a labor-saving device is used at the power plant of the Union Gas & Electric Company of Cincinnati, Ohio, which furnishes power to the South Covington & Cincinnati Street Railway Company. This crane serves as a dredge for an intake well of river water for cooling turbo-generator condensers. Water is supplied from the Ohio River to the intake well through tunnels, and is first cleared of water-logged debris and silt by means of a heavy bar iron grill. The crane is used in connection with the removing of this debris and silt from the bottom of the well. A grab bucket operated by the crane takes up the refuse and deposits it into a hopper. The grab bucket is often called upon to remove heavy water-logged objects.

The intake well has the shape of a sector of a circle. The crane spans the well radially, having one end truck pivoted at the center of the circle, while the other end travels on a circular track at the outside edge of the well. This truck is fastened directly to the floor at this level, and a pipe railing is provided around the crane and the operating mechanism of the traveling screens as a safety measure. The crane trolley with its suspended bucket travels along the entire length of the crane bridge or as far in toward the center of the circle as efficient operation of the bucket will permit. The operator's cab is fastened to this trolley and extends above the top of the bridge girders in such a manner as to give the operator an unobstructed view.



TRAVELING CRANE USED TO REMOVE REFUSE FROM INTAKE WELL

The installation was made according to specifications issued by Sargent & Lundy of Chicago, and the crane was built by the Whiting Corporation of Harvey, Ill. The span of the crane is 49 ft. 10 in. and the trolley is designed for a lift of 100 ft. of the grab bucket, which is of $\frac{3}{4}$ cu.yd. capacity. Two motors of $7\frac{1}{2}$ hp. operate the bridge and trolley travel respectively, and two 45-hp. motors operate the bucket hoist.

Combination Track Grinder and Drill

THE accompanying illustration shows a Stow electric railway track grinder in operation in Providence, R. I. The equipment consists of a multispeed motor mounted on a small truck and connected to the grinding wheel by a flexible shaft. This arrangement provides

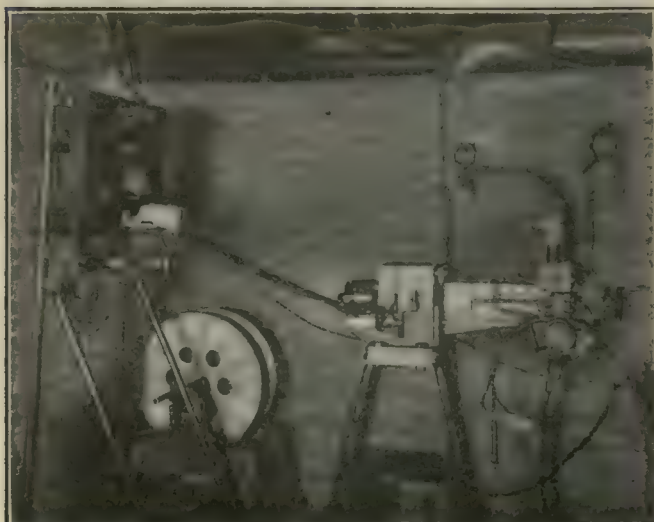


GRINDING TRACK IN PROVIDENCE R. I.

a grinder which is easily handled and can be used in heavy traffic centers without danger of interfering with traffic. The same equipment can be used for track drilling operations by removing the grinder and substituting a drill attachment. The motors used are compound wound and both dust and moisture proof. The change in speed is accomplished by varying the air gap in the center of the pole while the density is maintained at the pole tip. Motors are furnished in sizes of from $\frac{3}{4}$ to 3 hp. and with wheels in size 6 in. x 1 in. up to 12 in. x 2 in. This equipment is built by the Stow Manufacturing Company, Inc., Binghamton, N. Y.

Semi-Automatic Arc-Welding Outfit Increases Production

THE Third Avenue Railway, New York City, has recently installed in its Sixty-fifth Street car shop a General Electric semi-automatic electric arc welder shown in the accompanying photograph, which is at the present time being used to build up motor axle bearing housings. While the installation of this machine at the present time is of a temporary nature, the company has been able to increase the production of



SEMI-AUTOMATIC WELDER IN THIRD AVENUE RAILWAY SHOP

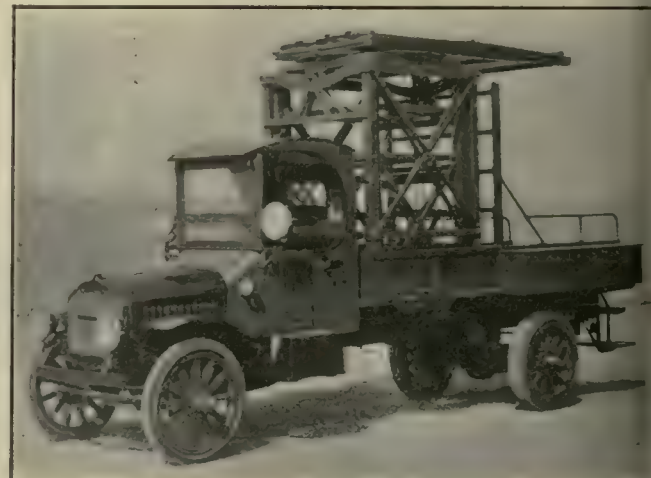
this class of work 25 per cent over ordinary hand welding. The company hopes to be able to increase its production 50 per cent or more when the apparatus is permanently installed and the operator has become thoroughly familiar with its operation.

The use of this machine does not require the services of a skilled arc-welding operator as the average mechanic can obtain good results from it after one or two days' operation. The arc length which governs the quality of all electric arc welding is electrically and mechanically controlled and is not subject to the variations of hand welding. This results in a better and more uniform quality of deposited metal. Another advantage with this type of apparatus is that the electrode material is fed continuously from a reel instead of being cut in short lengths as in hand welding, eliminating the necessity of frequent changing of electrodes and the waste of the stub ends.

This apparatus can be used for building up any worn surfaces, welding tanks and almost any arc welding that is now being done by the hand process. This apparatus is also used for welding complicated parts in production work where it is not feasible to use an automatic welder due to the difficulty of providing the necessary jigs and feeding mechanisms required for the automatic machine.

Overhead Tower Truck Used in Little Rock

THE Little Rock Railway & Electric Company uses a two-ton Mack truck with a Trenton three-section tower in connection with its overhead maintenance repairs. The truck has a 162-in. wheelbase and the wheels are equipped with solid tires. The Trenton tower is

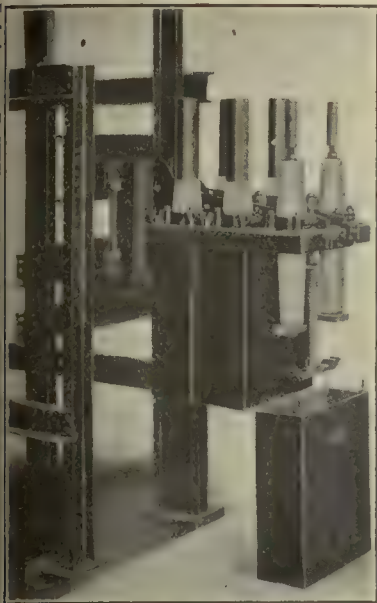


THREE-SECTION TOWER TRUCK IN LITTLE ROCK

12 ft. 2 in. from the ground to the platform in its down position and 18 ft. 4 in. when raised. The space inside the body is used for carrying wire, tools, etc., and a special wire rack is constructed at the back of the tower, which uses S hooks to hold the coils of wire.

Tool boxes are provided on each side and these are constructed so that the sides fold down and act as a shelf for use while repairs are being made. Search-lamps are installed at the front and are mounted on a double hinge, so that they can be directed in any direction. A box is provided inside the driver's cab for a 30-ft. extension cord, which can be plugged in on the dash to provide light at the point where work is being done at night. A complete electric starting and lighting system is installed as part of the chassis equipment.

Quick Break Oil Circuit Breaker



NEW TYPE OF CIRCUIT BREAKER

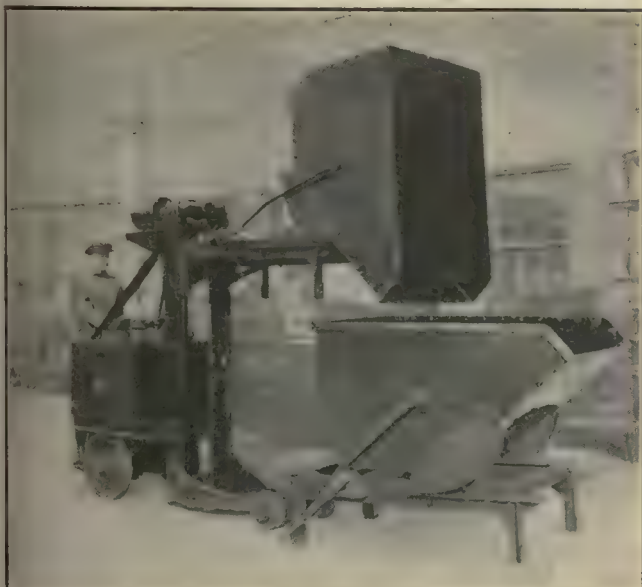
THE Condit Electrical Manufacturing Company has just brought out the type D-22 oil circuit breaker. This incorporates some of the principles used in its present type D-12. These include a strong tank rigidly supported at four points on the frame and a rigid frame construction to insure contact alignment. High-speed operation is obtained from a steel mechanism assisted by accelerating springs placed on each brush rod. Standard arc-

ing tips are used on both stationary and movable contacts. The type D-22 oil circuit breaker is furnished for either hand or electrical operation in sizes up to and including 1,200 amp. for 15,000-volt service.

New End Dump Skid for Use with Platform Trucks

TO FACILITATE the handling by an elevating platform truck of such materials as ashes, coal, sand, gravel and the like, the Lakewood Engineering Company, Cleveland, Ohio, is marketing an end-dumping body skid, with steel framework and steel legs. It also has a similar side-dumping skid. These are particularly useful for loading bulk materials and transporting to bins, motor truck bodies, cars, storage piles and the like.

The skids may be set down anywhere in the shops or yards for loading and when filled a platform lift truck can pick up the skid and transport it to the desired point. The dumping is controlled by levers on either

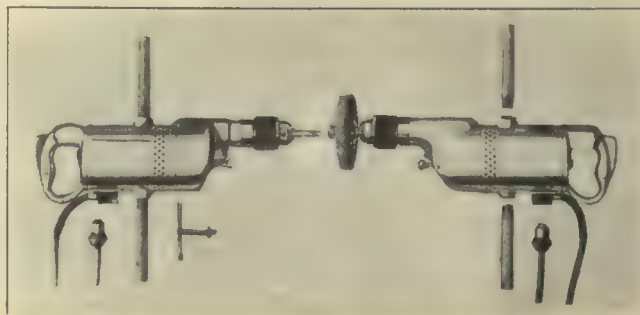


PICK UP AND DUMP POSITION OF BODY SKID

side of the body. The studded rocker and holes in the rocker race insure accurate alignment. The capacity of the end dump body is 27 cu.ft. and is limited to 100 lb. per cu.ft. The level capacity of the side dump is 18 cu.ft. The weight of load is limited to 3,000 lb.

Combination Electric Drill and Grinder

A NEW tool for use in shops where hand drilling and grinding operations are performed infrequently and where the purchase of separate machines is not warranted has been marketed by the Wodack Electric Tool Corporation, Chicago, Ill. The combination tool has a drilling capacity in steel of from $\frac{1}{8}$ in. to $\frac{3}{4}$ in. holes and when used as a grinder carries a 6-in. x $\frac{3}{4}$ -in. grinding wheel. Two separate speeds are provided, the slow speed for drilling and the high speed for grinding. The



PORTABLE ELECTRIC DRILL AND GRINDER

complete weight of the tool is 18 lb. and the motor develops $\frac{1}{2}$ hp. under load. A switch located in the top handle is a quick make and break automatic stop type, which insures the operator having the tool under control at all times. Aluminum castings and ball bearings are used throughout.

An Illuminated Station Sign

THE accompanying illustration shows the type of sign adopted by the New York Municipal Railway Corporation for use on the platforms of stations on the elevated structure at which both express and local trains stop and where the platforms are therefore placed between the tracks used by the two classes of service.

The sign itself is of enameled iron with white lettering placed on a dark blue background and supported by an ornamental iron framework. In order that the sign can be read easily at night it is

lighted by incandescent lamps placed with their axes in a horizontal plane and with their wiring in conduit, the lamps being concealed in the hood over the sign. These lamps, when an entire circuit of five is not used, are part of one of the circuits providing general illumination for the platform.

The hood is in the shape of an inverted trough, the sides being lined with white enameled steel which acts as a reflector and throws the light from the lamps down.



ILLUMINATED STATION SIGN

Letters to the Editors

The Rail Research Problem

PUBLIC SERVICE RAILWAY

NEWARK, N. J., March 8, 1922.

To the Editors:

In the issue of the *ELECTRIC RAILWAY JOURNAL* for March 4 appears an editorial on the subject of "Applying Some Real Research to the Rail Problem." The importance of this subject with reference to arc-weld joints is sufficient to warrant some further comment, although it is only recently that manufacturers and users of arc-welding equipment have come to a proper realization of the truth of the matter.

Among other things your editorial stated: "Some agency should have been established long ago to try out the various joints and processes on a limited scale on behalf of the whole industry." This suggests an arrangement, however, which, although ideal, will, in my opinion, never be fully realized. While I am a member of the recently formed committee on welded joints, I believe that, although this committee will ultimately accomplish a great deal of good, it is going to be seriously handicapped in its work due to the natural reluctance on the part of some individuals or companies to appropriate any money which would be used either wholly or in part for the investigation of other people's products or practices. They might, however, be willing enough to put up the money if they could be assured that it would all be spent in investigating their own joint problems. But in the operation of such a committee as has just been formed, any money contributed must necessarily go into a general fund to cover all research work, and without this money little that is worth while can be accomplished. Also, because of the size of the committee and the diversity of interests represented, it will necessarily be slow in reaching an agreement and submitting a final report.

The development of joint welding is taking practically the same course as did that of the electric motor twenty-five or thirty years ago. Arc welding has progressed, as your editorial states, only because a few electric railway engineers had the courage of their convictions and did not let failures in the early stages of their experiments discourage them from making further attempts. If some of the companies which did most of the waiting and "heavy looking on" in the earlier days had joined in the experimental work, the rail-joint-welding art would be further advanced than it is.

Manufacturers of arc-welding equipment have recently come to realize that, if they are to continue long in the business, they must obtain a more definite knowledge about what takes place under the action of the arc and how to control this action. An accurate knowledge of this is probably of more vital importance than the manufacture of the machine for producing the arc, if the welding process for rail joints is to endure. In the case of the seam arc weld, experiments would seem to indicate that certain physical characteristics in the resultant metal in the seam are essential if satisfactory results are to be expected. At least one company manufacturing arc-welding equipment is spending considerable money in making elaborate laboratory tests and analyses of welded joints, working in co-operation with

electric railway engineers using their product, in an effort at self-education on the subject. The experiments in question have already developed interesting and valuable data which have somewhat upset at least one previously accepted theory as to the effect of the carbon electrode on the carbon content of the resultant metal in the seam. Although represented on the committee on welded joints, the company referred to has for its own protection been obliged to go ahead with its own experimental research work, since it could not afford to sit quietly by and await the results of the work of the committee, which will necessarily be slow.

HOWARD H. GEORGE,
Engineer of Maintenance of Way.

Virtue in the Hole of the Doughnut

PLYMOUTH, MASS., Feb. 23, 1922.

To the Editors:

I am a New Englander from one of the oldest sections and am therefore qualified to speak on the question of doughnuts. I agree with you in your editorial in the issue of Feb. 11, that considering the misnomers applied to the delectable delicatessen which we, in this section of the country, dip in our morning coffee, it is dangerous to use them as subjects for comparison. But a doughnut in New England is in reality just what you use to build upon in your article. Its outline is formed by two concentric circles, one full of air and aroma and the other full of solid satisfaction.

In boom or depression we look at the hole as well as the doughnut, for without the hole the result would be a heavy, soggy doughnut such as one buys full of poor jelly in New York.

In boom times the hole represents the unemployed. In times of depression the doughnut represents wholesome unrest, and unrest means a getting back to normal times again. A doughnut sinks when it is first put in the kettle, but bobs up serenely as it becomes edible, so if the electric railways and manufacturers who sell service and supplies will watch the doughnut as it rises they will have no ground for pessimism.

JOHN RUSSELL, JR.

"Bus Transportation" Renders Valuable Service to Railway Companies

STONE & WEBSTER, INC.
Management Division

BOSTON, MASS., Feb. 25, 1922.

To the Editors:

I have noted with interest the controversy which has been going on over the propriety of your magazine's having inaugurated the publication of *BUS TRANSPORTATION*. The objections seem to boil down to a feeling that this move on the part of your magazine is disloyal to the electric railway industry. The thought that impresses me most with regard to the publication by you of "*BUS TRANSPORTATION*" is that it presents the subject from the point of view of the electric railway companies. The other magazines in the interests of bus transportation are published by parties antagonistic to the electric railway, and it seems to me, therefore, a decided boon to the electric railways themselves to have the subject of bus transportation ably presented by a concern which is familiar with their business.

C. W. KELLOGG.

Columbia, Carolina Capital City, Completely Carless

Strike Occurred Over Question of Right to Discharge—Resumption Delayed Because of City Ordinance—Compulsory Arbitration Act Passed by Legislature, but Company Applies for Injunction on Ground of Unconstitutionality—Public Opinion Favorable to Company



MAIN STREET, COLUMBIA, S. C., WITH STATE CAPITOL AT END OF STREET

THE City of Columbia, S. C., has had no electric railway service since Feb. 15. On the evening before the men decided to send the unwelcome valentine to the citizens of Columbia and to the company that they had decided to leave its service, which they did forthwith. Since that time the company has been unable to operate any cars because of an ordinance passed by the city in November, 1917, forbidding the employment of any motorman or conductor within the city unless he had received instruction on the cars in Columbia for the fifteen days immediately preceding the time of assuming his duties, the instruction to have been given by a motorman or conductor who had been actively employed in such capacity in Columbia for the six months immediately preceding. The penalty for the violation of this ordinance is a fine of not less than \$50 or more than \$100 or imprisonment of not less than ten or more than thirty days for each and every violation. In these circumstances the company had no option but to stop service.

Columbia is the center of a rich agricultural district as well as being the state capital and an important railroad center, the Southern Railroad, the Sea Board Air Line and the Atlantic Coast Line all entering the city. It has a population of about 50,000 and its railway system serves a population of about 10,000 more people. The Columbia Railway, Gas & Electric Company, which operates the railway system within the city, has about 55 miles of track, 53 motor passenger cars and 12 trail cars and is owned largely in Columbia. It has some suburban extensions, the longest being to Camp Jackson, 6 miles away. This extension was built during the war when the camp was used by the government for training recruits for the army. It now has only a small army post. The other main extensions of the railway are that to Ridgewood, 3 miles, and that to Olympia, 2 miles. The fare for some time has been 7 cents with 3 cents for a

transfer within the city. All of the extensions are within the single-fare zone except that to Camp Jackson, and on that line there are two zones of 7 cents each. All cars have been operated by two men because of a city ordinance passed a number of years ago declaring: "It shall be unlawful for any electric street car to be run in the streets of Columbia unless the same is in charge of a conductor."

COMPANY EXPLAINS SITUATION TO PUBLIC

Operated under the conditions which existed in 1921 the railway has not been able to pay even operating expenses, and last November the company thought it wise to explain the situation as it existed to the public. In consequence it published the following notice in the daily papers under date of Nov. 12:

COLUMBIA RAILWAY, GAS AND ELECTRIC CO.

F. H. KNOX, *President*

COLUMBIA, S. C.

November 12, 1921

The Street Railway Problem in Columbia

TO THE CITIZENS OF COLUMBIA AND VICINITY:

During the years that the street railway has been operated in Columbia, it has been the aim of those in charge to give good service and to keep the service in advance of the growth of the community. Every citizen of Columbia is interested, directly or indirectly, in having adequate and efficient street car transportation in Columbia and vicinity. Many people have no other means of transportation. The suspension of street car service would hurt nearly every business interest in the city, and some kinds of business seriously.

We are submitting the following statement of earnings and expenses in the street railway department for the first ten months of 1921:

Earnings street railway, all sources, ten months in 1921.....	\$375,761.97
Operating expenses, including taxes.....	467,716.43
Deficit	\$91,954.46

The above statement shows that the earnings of the street railway for the first ten months of this year are not enough by \$91,954.46 to pay the bare operating expenses and taxes. In other words the company is sustaining a direct loss of more than \$9,000 per month, besides the actual loss to the

investors in the property, by reason of the failure of the street railway department to earn any money with which to pay the interest on the large amount of capital invested in this department. Every effort has been made to reduce operating expenses and to operate the system as economically as possible, but we are still confronted with this large deficit. We have about reached the point where we cannot continue indefinitely the operation of the street railway system at such an actual loss.

Two ways naturally suggest themselves, by which the situation might be remedied to some extent. The first is, by raising the present rates of fare and, thereby, to increase the earnings. The company is of the opinion, however, that the present fare is as high as it should be, both for the interest of the company and for the interest of the people. It believes that the people should not be called upon to pay a higher fare, and it believes, further, that a higher fare would not bring in any more money to the company. The second remedy is to reduce operating expenses by reducing the wages of employees and, also, by reducing service. We believe that it will be necessary to make some reduction in the wages of our employees, but we think that this should not be a drastic reduction at this time, in fairness to them. We are also considering the reduction of service, and can effect some economy in this way, but we believe that the saving that might be effected by either one of these methods will not substantially reduce operating expenses. In other words, after we do all that can be done along these lines we believe that there will still be a very large deficit in receipts as compared with operating expenses, and so large that the company cannot stand these losses much longer.

The company desires to state to all parties interested that this problem has become acute. Whether or not some plan can be devised whereby it can be made possible to continue to operate a street car system in Columbia is fully as important a question to the people of Columbia as it is to any stockholder in the company—perhaps more important. We have always felt that we had the confidence of the substantial business people of the community, and it is their interest and the interest of the people who use the cars, as well as our own, which we seek to protect, and it is their advice and counsel we ask in helping us to solve this serious and perplexing problem.

Respectfully submitted,

COLUMBIA RAILWAY, GAS & ELECTRIC COMPANY.

CITIZENS ASKED TO GIVE MATTER THOUGHT

In commenting on the situation at that time F. H. Knox, president of the company, said, in part:

"The Columbia street car system is facing a crisis, a crisis which is causing the men connected with it deep concern. Our problems are the problems of the city of Columbia, and we are, in all sincerity, asking the citizens of Columbia for advice and for counsel in devising a plan whereby we can continue to operate the street cars.

"It is needless for me to stress the importance to a growing city of an adequate street car system. All persons who have given the matter any consideration know what a good street car system means in the growth and prosperity of a city, and we are as anxious to maintain a good system as are any of the people of this community. But a deficit of approximately \$91,000 in ten months operation is no light matter. How can we continue to operate the street cars under such conditions is the question before us, and it is a question that is of interest and importance to hundreds of citizens."

In speaking of the advertisements Mr. Knox said: "The company has no ulterior motive—we are facing a serious situation, and this situation may affect hundreds of citizens who depend on the street cars for transportation from place to place.

"We doubt the wisdom of increasing fares to 10 cents, and are not sure that such a step would increase our revenues. To replace our two-man cars with the 'one-man' or 'safety' car would involve a heavy expenditure and at that might not relieve the situation.

"To reduce the wages of our employees might bring some relief, but the company hopes to be able to avoid any drastic reductions. It is seen at once that the problem is not one easy of solution, and we hope the thinking people of Columbia will give the matter due consideration."

SLIGHT REDUCTION MADE IN WAGES

During 1921 the company had an agreement as to wages and working conditions with its employees who are members of local division 590 of the Amalgamated

Association. This contract expired on Dec. 31, 1921, and in its renewal the company sought some relief from the high-rate war wages which it had been paying and also better conditions as to assignment of runs and discipline, particularly in regard to the right to suspend or discharge any men when such action seemed to its officers necessary. In consequence it submitted the following agreement to the men as the best that it could make for 1922 and at the same time continue the operation of cars.

Proposed Agreement

"Memorandum of Agreement made this first day of January, 1922, between the Columbia Railway, Gas and Electric Company, hereinafter called the Company, and Local Division Number 590.

Section 1—The company agrees that the following rules and regulations shall be applicable to all motormen and conductors.

Section 2—The company will not discriminate for or against any employee by reason of his affiliation or non-affiliation with any labor organization; nor will it attempt to coerce or influence any employee against or in favor of becoming a member of such organization.

Section 3—The runs shall be arranged so that they will be as nearly nine hours long as practicable. In the assignment of runs, the company reserves the right to place men on such runs as in its judgment they are best fitted for.

Section 4—The company reserves the right to suspend and to discharge any motorman or conductor whenever in its judgment such action may be necessary.

Section 5—The wage scale on and after Jan. 1, 1922, until Jan. 1, 1923, shall be as follows: First three months, 41 cents per hour; second three months, 44½ cents per hour; six months and over, 48 cents per hour.

Section 6—This agreement to be in full force and effect Jan. 1, 1922, to Jan. 1, 1923; provided, that if the company shall cease to operate the street railway this agreement shall be at an end."

This contract proposed a reduction of approximately 10 per cent in the wages of the men but made substantial changes in certain other features of the previous contract.

DISCHARGES AND SENIORITY THE ISSUE

In reply under date of Dec. 24 the employees accepted the wage scale as well as Section 2 and insisted on "the right of seniority and arbitration" and suggested that this matter be left to arbitration. To this the company replied by letter as follows:

We note that you accept the wage-scale specified in the agreement submitted to you. We note, further, that you accept Section 2 in the agreement, in which the company recognizes the right of any employee to affiliate with any labor organization, or not to affiliate as he may think proper. The agreement also provides that the runs shall be as nearly nine hours long as practicable, this being the length of runs now in effect.

In any agreement between an operating company and its employees the essential provisions, which admit to exact definition, are the wage scale and the hours of work. It is the policy of this company to give every man a square deal and, wherever we can, to reward faithful and long service. Just what is a square deal cannot be defined in any agreement, as it is a very broad term. It touches every association and should be the controlling rule of all the men working for the company, whatever their position or work may be, in their relations one with another. We can say this, however, to every man working for the company who is honest, conscientious and efficient to the best of his ability in the performance of his duties, that he need have no fear of losing his job as long as the company can find any employment for him. The agreement submitted to you contains the best and fairest terms we have to offer.

We note, further, in your letter that you say you must insist on the right of seniority and arbitration. The street railway situation in Columbia has reached a critical stage, so critical that we may find it necessary to discontinue operations. In view of the seriousness of the situation we

cannot agree to submit to arbitration the question of whom we shall employ or discharge, or the work to which we shall assign our employees. In other words, if we are to continue operations we insist upon directing the affairs of the street railway to the best advantage. You may consider the position of this company final on these points.

During January and the first part of February, 1922, there was no change in the financial condition of the company. The figures for the year 1921 showed that the street railway department failed by \$119,758 to earn operating expenses and taxes, and during January, 1922, the deficit on the same basis amounted to \$11,886.

Finally, on Feb. 14, the company dispensed with the services of twenty-one conductors for adequate cause. This left 108 conductors and motormen in the service of the company. These men immediately struck. The company promptly published the facts in the daily papers in regard to the dispute, including the correspondence between the company and the union.

COMPULSORY ARBITRATION ORDERED

The issue was thus clearly drawn, *i.e.*, the right of the company to discharge men and assign runs. These points it considered it could not arbitrate in the interests of discipline and it declined to enter into any arbitration on these points.

While the cars were standing still, a bill was introduced and passed by the state legislature requiring compulsory arbitration between street railways in the state and their employees at the request of either party. This bill, whose application was limited to street railways in cities with a population of between 30,000 and 50,000, and thus covered Columbia only, declared that the board of arbitration for such disputes should consist of a representative from each side and a third to be chosen by them. If they could not agree the mayor of the city in which the railway company is located is to act as the third arbitrator, and if either party after five days notice fails to appoint its representative he shall

be named by the judge of the court of common pleas resident in the circuit. The decision of this board according to the act is declared to be final except on questions of law and on these appeal may be had to the state courts. This bill was ratified by the governor on Feb. 24.

To those to whom the passage of such an act by a state legislature may appear surprising it might be said that as recently as March 10, 1922, the Senate of South Carolina voted to attach a proviso to the act appropriating funds for the public school system, withholding financial support from all institutions of learning supported by the State "teaching, or permitting to be taught, as a creed to be followed, the cult known as Darwinism." Such institutions are permitted to explain what this cult is, just as they may tell the students about the legends in ancient Greek mythology, but they are not to teach the principle of natural selection and the survival of the fittest as a law of nature.

Another act of the South Carolina legislature, passed in 1915 and still on the statute books, forbids employees of "hotels, restaurants, cafés, railroad companies, sleeping car companies and barber shops" from receiving "gratuities or tips." This act, according to law, is posted in all hotels, restaurants, railroad stations and barber shops, and all persons are warned not only against the receiving but the giving of tips.

Following the passage of the arbitration act and its approval by the governor on Feb. 24, the Columbia Railway, Gas & Electric Company lost no time in applying for an injunction in the South Carolina State Supreme Court to restrain any action taken under the compulsory arbitration act on the ground that it is unconstitutional. Briefly, the reasons for this contention were that the statute was discriminatory, first because it applied to only one of five electric railway companies in the state and second because it differentiated electric railway companies from other corporations. The company's plea also declared that the act violated the free-

To Our Street Car Patrons

The company is greatly concerned over the possibility that any of its patrons should think that it is unreasonable in its position with reference to the strike.

The company is willing and anxious to resume service as soon as it can do so under circumstances and conditions that offer any possibility of successful permanent operation.

It is impossible for us to operate the street cars unless we can have the right to select our motormen and conductors, the right to specify their work and the right to discharge them without arbitration. Any effort to operate under a contract, taking these rights away from us, will necessarily result in failure within a very short time. The company feels that in standing out for these rights it is not only seeking to promote its own interests, but is also seeking to promote the interests of its patrons and the public, because any effort to operate otherwise is certain to result in failure and very probably cause the permanent abandonment of the street car system in a very short time.

The company is advised by its attorney that the arbitration act is unconstitutional and proposes to immediately test it in the courts. If the company arbitrates under that act it runs the risk of having an award imposed upon it under which it can not possibly operate successfully.

We sincerely believe that in standing out for what we consider to be our rights and for what is necessary to the successful, permanent operation of the street cars here, we are doing the right thing for ourselves and for those using the street cars.

An ordinance, adopted by city council in 1917, forbids under heavy penalty any person from acting as motorman or conductor who has not had fifteen days' instruction in this city by another motorman or conductor of six months' experience. This ordinance makes it impossible for us to secure any motormen or conductors.

Respectfully submitted,

Columbia Railway, Gas & Electric Co.

By F. H. Knox, President.

February 27, 1922.

To the Motormen and Conductors Formerly in the Employ of the Columbia Railway, Gas & Electric Company

The Columbia Railway, Gas & Electric Company is anxious to resume operation of its street cars. It will reinstate the motormen and conductors leaving its service on February 15, at the same rate of pay that they were drawing on that date, and with their seniority rights as of that date, in so far as it is possible for the Company to recognize them.

The Company will make no discrimination between union and non-union men, and there will be no discrimination against any former employee because he left the service on February 15.

The rate of pay for this year is as follows:

First 3 months, 41c per hour.
Next 3 months, 44½c per hour.
Six months and over, 48c per hour.

As stated above, former employees will be reinstated at the rate of pay they were drawing on February 15.

The Company reserves the right to discharge employees.

**Columbia Railway,
Gas & Electric Company**

By F. H. Knox, President.

March 2, 1922.

dom of contract in that it allows a third person to fix the terms of an employment contract. A decision of the court on this plea for injunction is expected within a very few days.

RAILROAD COMMISSION WILL ACT

During the present session also the legislature has increased the Board of Railroad Commissioners from three to seven members. Previously these members have been elected directly by the voters. The last named members were elected by the legislature. The attorney-general is said to have given the opinion that the newly constituted commission has authority to regulate the service of the street railway company, but nothing has yet been done by the commission as it has only just been organized.

THE PUBLIC TRAVELS BY AUTO

As a substitute for trolley service since Feb. 15, the public has been forced to walking and riding in automobiles. The number of autos in and around Columbia is very large, the streets are wide and the pavements are fairly good. Moreover, the main business street of the city, called Main Street, is a very wide thoroughfare with ample accommodation for parking. A view of Main Street with the State Capitol in the distance is given at the heading of this article. Not a large number of jitneys have put in an appearance, but owners of autos have been very liberal in "giving a lift" to their friends and even to strangers. In addition, some of the large employers of labor, like the cotton factories, carry their employees in standing loads between the center of town and their places of work on trucks.

There has been one attempt to conduct a mass indigna-

tion meeting against the company, but the general sentiment about this and the action of the legislature can be gaged by the following, which is part of an editorial in the *Columbia Record* of March 10:

We have entered on the fourth week of the street car strike in Columbia. The prospect of a settlement of it seems to be as remote as ever it was. What are we going to do about it?

The mass meeting at the court house on Monday night was manifestly "staged." A casual inspection of the names of the speakers, and a little knowledge with regard to their relations to our general business situation and to politics, is all that is necessary to enable an observer to reach this conclusion. The meeting was nothing more than a gesture. The foregathering of union leaders, union men, politicians in office, politicians seeking for office, and attorneys affiliated to the carmen's union and to former litigation against the company, is not convincing as a manifestation of public indignation against the company.

The effort to create public opinion in favor of the carmen who struck without notice because the company discharged some members of the union does not strike us as an intelligent effort to settle the strike in the present and ultimate interest of Columbia and its public utilities.

Other gestures have emanated from the politicians in the General Assembly. They are equally futile, as we view the situation. The public utilities in Columbia have long been the football of small politicians and small candidates for public office. The issues involved cannot be settled by such as these, who fatten on prejudice and truckle wherever a vote is in prospect.

But there must be a settlement of the problem, somehow and sometime soon. It occurs to us that the matter is of sufficient consequence for the really and vitally interested business men of the city, who have a stake in the community and work for a living, instead of eternally "politicking," to seriously investigate, impartially, with an eye to the future, and in calmness of judgment, in order to ascertain if something can be done. We believe that most people are growing weary of political gestures.

Executive Board of Federated Engineering Societies Meets in Chicago

WITH President M. E. Cooley, dean of the colleges of engineering and architecture, University of Michigan, presiding, the executive board of the American Engineering Council, Federated American Engineering Societies, met in Chicago on March 10. The board spent the day in giving consideration to a host of subjects which came up for attention, and was entertained in the evening by the University of Michigan Engineers' Club of Chicago with President Marion LeRay Burton of the university and Dean Cooley as the principal speakers. Dean Cooley gave expression to some of the ideals and purposes of the Federated Societies. He spoke of how little the engineer is known in the mind of the general public and said that the ambition of the Federated Societies movement is to put the engineer up in his proper place in public esteem and give him the opportunity to play the part in public affairs for which he is needed. He pointed out that the present organization comprises twenty-eight societies with a membership of approximately 50,000 and that when all societies which are entitled to membership have taken it, there is a prospective membership of from 175,000 to 250,000 engineers. When the engi-

neers are brought into their own in public affairs through this organization, the dean predicted that legislation would be handled on a broader basis with less evidence of selfish interests and compromise.

Speaking of the accomplishments of the Federated Societies, Dean Cooley mentioned the investigation to eliminate industrial waste as the greatest. Another important thing was the work done in bringing about the passage of the bill by Congress which will authorize a reorganization of the U. S. Patent Office. Perhaps of greatest interest was his statement of the kind of things which the Federated Societies can undertake. Among these was a study of the transportation systems. He pointed out that the present average mileage of a freight car is 24 miles in a day. If a study should bring out how it might be possible to increase this even to 50 miles per day, he said that the saving in equipment and in train crews alone, would be enough to pay a return on the entire railroad investment. It was his opinion that the engineers should make such a study, for it is the engineer who has built the railroads, who is operating them, and who knows what the costs are, and yet he

has taken no part in the great transportation problems as they have been before the public.

Dean Cooley expressed the thought that the public does not want the opinion of individual engineers in such great matters of public concern; what it does want is the opinion of the engineering profession. The public, the utilities commissions and the courts refuse to take the word of anyone, and this merely points again to the great need for the expression of profession-wide advice which may be accepted as being free from selfish interest and inspired only by the desire to serve the best interests of all.

Other things mentioned as the kind that can be undertaken by the Federated Societies, by the dean, were foreign trade development and what to do about the forests and reforestation.

ACTION TAKEN BY EXECUTIVE BOARD

In its meeting during the day the executive board of the Council discussed in some detail the aspect of the proposal to form a world-wide engineering organization and a committee was authorized to consider the various phases of the whole question including such constitutional changes as would be necessary. The Sterling bill for reclassification of engineers was indorsed rather than the Lehlbach bill, since the salary schedules of the former were

approximately 10 per cent higher than in the latter and conform more nearly with the report of the original reclassification committee.

The subject of employment service, which the committee on that subject believed should be turned back to the jurisdiction of the constituent societies, was permitted to remain in status quo and a new committee was authorized to bring in a new report. The proposal that the societies should publish a bulletin was laid on the table and later revived and a committee asked to bring in information on proposals made to handle a bulletin by a private publisher. Other subjects laid on the table were the proposals to take a part in the Muscle Shoals project, the utilitarian use of national parks, tariffs on technical books, the Great Lakes-St. Lawrence Waterway, and the International Engineering Congress in Rio de Janeiro. The recommendations of the conference on paving brick standardization were approved.

Canadian Association Will Convene at Quebec

PREPARATIONS are in full swing for the annual convention of the Canadian Electric Railway Association, which will be held at Quebec, June 1 to 3. In connection with the meeting there will be an exhibit of electric railway supplies. The Drill Hall, a five-minute walk from the Chateau Frontenac, will be used for the meeting and exhibit. The hall provides space for from twenty-five to thirty exhibits.

On March 14, R. M. Reade, superintendent city division Quebec Railway, Light & Power Company, chairman of the committee on exhibits, sent to all associate members the details of the exhibit plans. He sent a chart of the Drill Hall, showing the spaces available and the allotments to all associate members. The space is donated, and Mr. Reade's committee will do everything in its power to facilitate the preparation of exhibits. Power will be supplied to exhibitors desiring to have an operating exhibit.

Annual Banquet of New England Club

THE twenty-second annual banquet of the New England Street Railway Club will be the occasion of several notable addresses. The speakers will be Hon. Channing H. Cox, Governor of Massachusetts; Hon. James M. Curley, Mayor of Boston; Hon. William D. Riter, Assistant United States Attorney-General, and Gen. Guy H. Tripp, chairman of the board of directors, Westinghouse Electric & Manufacturing Company. The toastmaster will be Hon. Samuel L. Powers.

The banquet will be held at the Copley Plaza Hotel on Thursday, March 23, at 6:30 p.m., preceded by a reception at 6 o'clock. On Thursday afternoon at 3 o'clock the annual meeting for the election of officers will be held.

Government and Industry Co-operate in Standardization

AT THE request of Hon. Herbert C. Hoover, Secretary of Commerce, the American Engineering Standards Committee has designated A. A. Stevenson, the retiring chairman of the committee as a special representative to work with the department in the operation between the department's Division of Simplified Practice and the American Engineering Standards Committee.

The Division of Simplified Practice is a co-ordinating unit of the Department of Commerce assisting in those reductions of excessive variety and other simplifications which many industries are undertaking in order to decrease the cost of production and distribution of manufactured articles. The work of the division was organized in the latter part of 1921 and is now actively under way.

Mr. Stevenson, who is a past-president of the American Society for Testing Materials, is vice-president in charge of manufacture of the Standard Steel Works Company, a subsidiary of the Baldwin Locomotive Works.

AMERICAN STANDARDS "IN PROCESS"

A report just issued by the American Engineering Standards Committee states that on Dec. 31, 1921, seventeen

standards were definitely before the committee for approval. Those of particular interest to electric railway men were the following:

Standards of American Institute of Electrical Engineers, National Electrical Safety Code, specifications for carbon-steel and alloy-steel forgings; and quenched and tempered carbon-steel and alloy-steel axles, etc., safety code for the use, care and protection of abrasive wheels. Since the report was prepared the abrasive wheel code has been approved as explained below.

Safety Code for Abrasive Wheels

THE American Engineering Standards Committee has approved as "Tentative American Standard" a safety code for abrasive wheels. This was prepared under the joint sponsorship of the Grinding Wheel Manufacturers Association of the United States and Canada and the International Association of Industrial Accident Boards and Commissions. The code contains rules and specifications for the operation of wheels operating at speeds in excess of 2,000 surface feet per minute. Copies may be secured at a nominal price from the committee, 29 West Thirty-ninth Street, New York, N. Y.

American Association News

Bus Operation Discussed from Transportation Angle

A MEETING of the T. & T. Association committee on trackless transportation, which is co-operating with the American Association committee on the same subject, was held in Baltimore, Md., on March 15. Viewing the subject from the transportation angle the committee held that the bus could function economically under certain conditions. To establish the limiting conditions the committee plans to submit as a part of its report a comprehensive analysis showing under what traffic conditions and operating costs the motor bus, the trolley bus and rail operation can function to the best advantage, each as a co-ordinated part of a complete urban or interurban transportation system.

The committee also undertook to skeletonize its report for the purpose of analysis and to bring out constructive discussion for its next meeting, scheduled to be held on March 30 in Baltimore.

Those present at the meeting were C. D. Porter, Newport News, chairman; J. L. Adams, Philadelphia & Western Traction Company; W. E. Martin and L. H. Palmer, Baltimore; and H. B. Flowers, Baltimore, chairman of the American Association trackless transportation committee.

Association Bulletins for February

THE following reports were prepared by the bureau of information and service during February:

State Regulation of Motor Vehicles, containing copies of all state legislation affecting the operation of motor vehicles as common carriers.

A Compilation of Cities in which Fares Were Changed. This information is as of March 1, 1922, and shows the city, population, operating company, cash fare, ticket rates, etc.

Employees' Welfare Plans. This is a report made to the New York Transit Commission covering benefit systems, social and recreational activities, individual and group rewards, profit sharing and employee representation in the management of electric railways.

Pole Statistics, showing, for a group of the larger companies the number and types of poles in use and the annual renewals and additions from 1917 to 1921.

Maintenance Costs of Company Automobiles and Line Trucks. Gives detailed figures for month of October and the ten months ending Oct. 31, 1921, of two electric railways.

Working Conditions of Trainmen. This is a supplement to last month's compilation of the same name and gives data for fifty additional companies.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

People Will Decide

Stockholders of the D. U. R. Unanimously Vote for Sale of Property to City—Final Step Reached Before Election

At the stockholders' meeting of the Detroit United Railway on March 11 the contract entered into by the company's directors providing for the sale of the Detroit city system to the city was ratified by a unanimous vote. This act paves the way for a vote on unified municipal ownership of street railways in Detroit and a special election will be formally called for April 17 to vote on the purchase plan.

THE company agreed to sell for \$19,850,000, its entire system including lines, cars, carhouses and real estate located in Detroit, Highland Park and Hamtramck, with the exception of about 15 acres of its 46-acre property in Highland Park, 12 acres at Mackinaw Avenue, on Grand River Avenue and the Interurban building at Jefferson Avenue and Bates Street, Detroit.

BOND ISSUE WILL BE PUT BEFORE PEOPLE

At the special election the voters will also be asked to vote a bond issue of \$4,000,000, out of which the company is to receive a down payment of \$2,770,000. The balance of the bond issue will go to meet expenses incidental to taking over the lines, as an operating fund, and for the purchase of material now on hand from the company. The increase in the bond issue over what was originally thought necessary was deemed essential by the street railway commission to allow the entire system to start efficient operation. If the purchase plan is approved by 60 per cent of the voters the lines will be taken over on or about May 17.

In addition to the down payment, the agreement provides that the city shall pay \$500,000 semi-annually until Dec. 1, 1932, when the balance is to be paid in a final payment. Interest at the rate of 6 per cent per year is provided for on all deferred payments.

If the people vote for the purchase of the company's lines the thirty-year war between the city and the company will be ended. Along with approximately 300 miles of track the city will acquire 592 double-truck cars, 196 large trailers and 369 smaller cars.

Mayor Couzens expressed his satisfaction with the proposed terms of sale, believing that the lines can be made to pay their own way, meeting the semi-annual payments and paying all interest on indebtedness. Eventually, he believes, the lines will show a surplus and the sinking fund and interest charges on the \$15,000,000 bond issue voted in 1920 for the construction of a municipal system will be met.

The property which the company is willing to sell for \$19,850,000 does not include all that was included in the

\$31,500,000 purchase plan that was voted down in 1919. Since that time the city has acquired approximately 30 miles of the company's tracks and 128 cars taken over at a price of approximately \$2,400,000. The cars have been in use since they were acquired in maintaining joint operation over company lines. The following outstanding features are embodied in the agreement.

The city of Detroit, subject to a three-fifths vote of the electors, agrees to buy from the company all the street railways, street railway property (including franchises and other rights) and real estate, together with all overhead and underground wires and appurtenances except panels and feeders for the company's interurban system. It is to pay in cash on or about May 15, 1922, \$2,770,000 and \$9,500,000 in nineteen semi-annual installments of \$500,000 each on the first day of December and June, commencing Dec. 1, 1922, and including Dec. 1, 1931. On Dec. 31, 1931, the balance of \$7,580,000 is to be paid in cash. Interest is to be paid quarterly on unpaid portions at 6 per cent per annum. The city reserves the right to increase the semi-annual payments, provided it gives the company thirty days' notice.

The property is to be maintained in good repair at all times until the purchase price is fully paid. The city may abandon or remove certain trackage specified which, by reason of shifting population and the like, becomes useless and unprofitable. The company is to maintain all property in the present state of efficiency and repair until the date of actual delivery to the city of possession of the property to be conveyed. Interurban or suburban service of the company is to be allowed to continue substantially as at present. Passenger cars to use the present interurban station as a starting point. The existing freight terminals are to be continued. Interurban cars are to be operated by the company's own crews subject to city control and regulation.

STEPS IN EVENT OF DEFAULT EXPLAINED

The company's permit to use the city lines for its interurban cars may at the option of the Board of Street Railway Commission be suspended or terminated whenever the company is in default of any of the terms of the agreement, if default continues for sixty days after written notice of intention to declare the permit suspended. The city is to have the right to terminate the permit to operate the interurban cars over lines within the corporate limits at the end of any calendar year after two years notice of such intention. Such notice shall consist of a resolution adopted by the Board of Street Railway Commission confirmed by the Common Council.

The city does not agree to become personally liable to pay the balance of the purchase price or the interest thereon. To enforce the payment the company may resort to the courts. No part of any extension or addition to the railway system made by the city is to be subject to the lien of any mortgage made by the company.

Of the initial payment, \$2,500,000 and the fifteenth semi-annual payments of \$500,000 each are to be deposited in escrow with a trust company, all expenses chargeable to the company. This money so deposited is to be used by the company to purchase or pay outstanding obligations of the company.

In event of default of payment of any installment or interest on the unpaid price or part thereof, the company may apply to a court of equity to obtain a specific performance of the contract, which court may establish and compel the collection of such rate of fare as will provide adequate funds to meet defaulted obligations, and may appoint a receiver of the property, securing the unpaid balance of the contract and grant any further appropriate relief. Or the court may through any lawful agency take possession of the property and operate it at an adequate rate to meet defaulted obligations.

In event of default in payment of the final balance of \$7,580,000, the company may foreclose the contract by lawful method and have the right of the appointment of a receiver.

When the property is delivered to the city, the company is simultaneously to deliver any books, records, documents, literature and data needful for use in the management and operation of the property.

All pending suits and actions and alleged causes of action between the parties are to be settled, released and discharged upon the execution of the agreement, and the city is to withdraw all pending complaints and suits for violation of ordinances.

Since the purchase price is less than the amount of existing mortgage liens, the company warrants and defends the city from any action that might result from the excess liability, and this undertaking is to be a lien against the remaining Detroit United Railway assets. The property is to be freed by the company of all debts or obligations and no additional mortgages or liens are to be issued by the company.

The right is given the city to sell separate parts of the property whenever such parts become useless for street railway purposes.

Pending approval by a requisite vote of the electors of Detroit, and the transfer of possession, neither party acquires nor waives any right it may have, if any, to operate cars over the streets of the city. In event of the rejection by the electors, the rights of both parties will remain in all respects as if the agreement had not been entered into.

At the meeting of stockholders and directors, Elliott G. Stevenson, former chief counsel for the Detroit United Railway, was elected acting president and member of the board of directors as well as chairman of the executive committee of the company, replacing Allen F. Edwards.

The office of president will be left vacant until the outcome of the purchase plan is known. Judge Charles Laurandean, Montreal stockholder, was elected first vice-president and E. J. Burdick, former general manager, was also made a vice-president. A. Avila Gingras was made treasurer, and Joseph Bampton assistant treasurer. J. E. Gill, J. O. Desmarais and M. A. Boivin of Montreal were replaced on the board of directors by E. J. Decary of Montreal, Mr. Stevenson and Mr. Burdick.

Four Cents an Hour Reduction in Reading

A new wage scale affecting employees of the Reading Transit & Light Company, Reading, Pa., went into force on March 1. The new schedule effects a reduction of 4 cents an hour. The new rates in cents per hour are as follows:

First six months.....	41
Second six months.....	42
Third six months.....	43
Fourth six months.....	44
Fifth six months.....	45
Thereafter	46

Court's Aid Sought

Pacific Electric Railway Petitions Court to Make Strike Injunction Order of 1918 Permanent

In the United States District Court at Los Angeles the Pacific Electric Railway on Feb. 28 petitioned to make permanent the temporary restraining order issued by U. S. District Judge Bledsoe on July 2, 1918, against the company's trainmen, who went out on a strike during July, 1918, while the United States was at war.

The action is the Pacific Electric Railway against M. E. Montgomery and J. A. Farquason, organizers of the Brotherhood of Locomotive Engineers and Brotherhood of Railroad Trainmen with headquarters in Cleveland, Ohio; O. T. Lafever, James Smith, George Duncan, C. N. Herb, A. N. Miller, W. J. Clark et al. Montgomery and Farquason came to Los Angeles in July, 1918, according to reports, and tried to organize and unionize the employees of the Pacific Electric. It was at the peak of the war with Germany and thousands of men were daily passing over the company's lines between the shipbuilding plants at Long Beach and San Pedro Harbors, also from the rendezvous of troops at the Arcadia Balloon Training Camp and Ft. MacArthur. The temporary order of the U. S. Judge broke the contemplated strike. The union officials demanded that the employees quit the service unless the unions were recognized, but this was not done.

It has been deemed best by the Pacific Electric Railway that the temporary restraining order be made permanent, so as to avoid any recurrence of the industrial crisis which threatened in 1918. The temporary order restrained the defendants from interfering with the employees of the Pacific Electric Lines; from unionizing the employees; from interfering with the trains or trespassing on the property of the company.

The hearing of the company's petition in the United States District Court was held before Judge Frank M. Rudkin of Spokane, Wash. The temporary restraining order of July 2, 1918, as issued by Judge Bledsoe was confirmed by the U. S. Circuit Court of Appeal.

The first day of the hearing brought an effort to make it appear that the strikers who had engaged in the July, 1918, strike had no connection with officers that managed the strike on the company's lines in August, 1919, and that they had been quiescent since Judge Bledsoe issued the temporary injunction in 1918. On the other hand, there was a strong line of testimony showing that the defendants and members of the unions had maintained hostility to the railway and were only awaiting the opportunity that would be afforded by the refusal of the court to make the restraining order permanent to start another attempt to unionize the employees of the line.

Judge Rudkin informed the defend-

ants that if the officers of the lodge proposed to shield themselves behind the cloak of secrecy obtaining in an organization of that sort that the presumption would be against them. This brought the attorneys of the defendants to their feet as one of their witnesses, F. R. Fish of the Brotherhood of Locomotive Engineers, had signed a circular dated Feb. 12, 1922, that asked for a postal-card vote on the question as to the payment of strike benefits growing out of the strike of July, 1918—this to show that the present officials of the unions were still behind the strike of 1918.

In presenting the grounds upon which the plaintiff corporation asked that the temporary injunction be made permanent, railway counsel said that among the members of the Railroad Trainmen and the Brotherhood of Locomotive Engineers the strike of July 2, 1918, was still regarded as "on." John Chriss, a motorman, gave testimony of the efforts to organize the employees in 1918, and said he had been told by A. N. Miller, a union organizer, that it was the intention to unionize the Pacific Electric, and that there would be \$15,000,000 of the funds of organized labor to make the drive a success. If he did not join he would be blacklisted.

Attorneys for the defendants claimed that the preliminary restraining order was a war measure and that the ban ought to be lifted so that the men might organize if they now desired to do so. He would not admit that they intended to do so, but asserted that there was no law in the land against men organizing for a lawful purpose. "Dissolve this temporary order," he said, "and if the men disobey the law in any way, bring a new action."

The strike is still on, railway counsel stated, and if the pending injunction is dissolved, the work of unionizing the Pacific Electric Railway will be resumed. Defendant's attorneys in addressing the court asserted that the strike was favored only by the employees of the railway, and not by Messrs. Montgomery, Farquason and others.

The hearing lasted four days. Judge Rudkin then took the matter under advisement. It will take about two weeks to render a decision. The railway counsel in his final plea to the court asked that the power of the court be imposed against outside interference, and that the defendants be compelled to cease trying to unionize the lines.

What is known as the Hitchens Coal & Coke Company case, in which a sweeping injunction by the United States Supreme Court was issued restraining union-labor organizers from operating among the men employed in West Virginia mines has been largely relied upon by the plaintiff corporation, in the pending proceedings.

Counsel for the defendants argued that the temporary restraining order was a war-time act and that unusual conditions were in evidence, that did not now obtain.

New York Fare Bill Amended

The bill recommended by the New York Transit Commission defining its authority to change rates of fare on New York City traction lines has been amended in both Houses.

The mandatory fare provision is changed so as to except common carriers other than street railroads not included or proposed by the commission to be included in the general plan of readjustment. This change, it is explained, is to avoid any conflict with the general powers of the commission in fixing rates for steam railways between points within city limits.

Another change clarifies the provision that on termination of the lease between the Interborough Rapid Transit Company and the Manhattan Elevated Railway for the operation of the lines of the latter, the commission may require that joint operation be continued for one fare.

There is taken out of the law the clause fixing definitely the salaries of the commission's counsel and secretary so that they may be fixed in the commission's discretion.

At the insistent demand of Corporation Counsel O'Brien, the public service committee of the Senate has agreed to send the measure, now on third reading, back to the committee for a hearing.

Chicago Subway Plan Not Yet a Reality

Chicago is again indulging in dreams about subways which may or may not materialize. Newspapers in that city recently published a plan for a comprehensive rapid transit system which is said to have been agreed upon by the committee of engineers recently appointed by the local transportation committee of the City Council, although no official report has been made by that body. The plan is said to contemplate 56 miles of tubes providing for 131 miles of single track with a view to carrying over 1,000,000,000 passengers a year. The city has not been able to interest the surface or elevated companies in its project and if the subway is to be constructed as an independent system the only fund available is about \$30,000,000, which it is realized would not go far to carry out the plan.

Franchise Draft Rejected

The City Council of Spokane, Wash., recently rejected the proposed franchise submitted by representatives of the Washington Water Power Company and the Spokane & Eastern Railway & Power Company. The franchise provided for a merger of the local traction systems with service-at-cost upon a 7-cent fare basis. The franchise also provided for the elimination of jitneys.

The Corporation Counsel was ordered to draft a new franchise providing for a 6-cent fare without service-at-cost and with no provision for the elimination of buses.

Supreme Court Denies Review of Decision

The Supreme Court of the United States recently denied the application of the Puget Sound Power & Light Company of Seattle, Wash., for review of a decision rendered against it by the U. S. District Court for Western Washington, in proceedings brought against S. B. Asia, Daniel W. Bass and others. The power and light company, as the owner of \$15,000,000 Municipal Street Railway bonds of Seattle, sought to set aside a decision obtained by Asia and his associates in a suit brought by them against the city to restrain, among other things, the application of the gross revenues of the municipal railway system to the payment of principal and interest on the bonds in preference to charges for maintenance and operations. Brief mention of the decision in this case was made in the *ELECTRIC RAILWAY JOURNAL* for March 11.

Counsel for the "fourteen taxpayers" expressed gratification at the Supreme Court's decision, pointing out that the high court in sustaining District Judge Jeremiah Neterer has kept the way clear for the taxpayers' litigation in the state court, seeking to protect the tax fund of the city of Seattle from encroachment by the municipal railway. The taxpayers' action against the city in the state court is now before the State Supreme Court on an appeal from a decision of Judge J. T. Ronald.

Another phase of the litigation over the municipal railway, the suit of the Puget Sound Power & Light Company to compel "specific performance" by the city of the terms of the contract by which the city bought the company's lines for \$15,000,000, will be taken before the U. S. Circuit Court of Appeals by the city of Seattle, which lost in the decision of Judge E. E. Cushman in the U. S. District Court there recently.

Commission Announces Stand on Recent Court Rulings

Little change, if any, will be made in the work and jurisdiction of the California State Railroad Commission by the recent decisions of the Supreme Court in the Wisconsin and New York cases in relation to state rates under the federal transportation act. This is the view of the members of the commission. No new principle, it is said, was announced in the cases, the principle that state rates influencing interstate rates come within the jurisdiction of the Interstate Commerce Commission having been established in previous cases. The later decisions merely confirm the earlier doctrine. The commissioners add that even if the state railroad board had nothing to do with railroad rates, it still would have much work before it in keeping the roads in condition to serve the public properly.

The views of the commission were contained in a statement by Commissioner H. D. Loveland, who stressed the fact that the people of California should

realize that the regulation of railroad rates constitutes a rather small share of the commission's work. He said that the name "railroad commission" was a misnomer dating back to the time when the regulation of railroad rates was the commission's only function. He said that since the passage of the public utilities act in 1912 the California Commission has been a public utility commission.

Bill Provides for Comprehensive Transit Scheme

Development of a system of rapid passenger traffic between New Jersey cities lying within the territory covered by the Port Authority plan and between the municipalities and Greater New York is provided in a bill introduced in the State Legislature. The measure creates a commission of seven members to investigate and report on passenger traffic facilities in the state embraced in the Senate Port Authority treaty. The commission will co-operate with the Port Authority. The bill carries an appropriation of \$5,000 for expenses, the commissioners to serve without compensation and to be appointed by the Governor. The bill says the commission shall have power to study and report upon the best plan or plans to be followed in providing a comprehensive scheme of rapid transit between its several communities in North Jersey as well as between such communities and the city of New York.

Interpretation Asked of Recent Wage Award

Employees of the Springfield (Mass.) Street Railway are trying to bring about an early hearing by the arbitrators in relation to certain points in the recent awards the interpretation of which is in dispute. Complaints relate more especially to the application of the provision for a fourteen-hour spread, with guarantee of seven hours pay, for spare men. In a readjustment of schedules the company was enabled to split certain runs in a manner to reduce operating expenses. This is done by shifting men at the carhouses or some other convenient transfer point, so as to avoid paying for dead time. The men contend that the management has no right to take a man off a run before the run is completed, to transfer him to another run. Another contention is that the fourteen-hour spread must be confined to a certain calendar day, which would mean that spare men could not be sent out after 10 o'clock in the morning under this arrangement. It is urged by the men that such a limitation is needed to assure proper rest and sleep between two fourteen-hour spreads. The management expresses confidence that it has correctly interpreted the arbitrators' decision, and says that the fourteen-hour spread is being applied in the same manner as it has been in Worcester for years.

Franchise Settlement Hinges on Auto Regulation

In Decatur, Ill., the Decatur Railway & Light Company, a subsidiary of the Illinois Traction Company, is seeking to negotiate a franchise extension. M. L. Harry, manager for the company at Decatur, recently outlined the conditions that should govern any grant made in that city at this time. He said that the new franchise must protect the company and the public and must be such as to enable the company to establish credit so that it can borrow money for extensions. It must be elastic enough to employ changes in transportation methods should such changes develop and above all it must protect the company against irresponsible, unregulated and unburdened competition.

The matter which looms up as most important in Decatur is one of protecting the company adequately against unfair bus competition. Mr. Harry indicated that until the matter of terms that shall govern bus operation in Decatur is decided, consideration of other terms of the franchise would be a waste of time.

Time Is Extended in Which New Haven May Dispose of Trolleys

In the United States District Court at New York, Judge Hand has signed an order extending until July 1, 1923, the time allowed the New Haven Railroad, by the decree of Oct. 17, 1914, to dispose of certain securities. The original decree was entered in a suit brought by the United States under the anti-trust laws and required the New Haven and the New England Navigation Company to dispose of the stock which they held in the Connecticut Company, the Berkshire Street Railway, the Vermont Company, New York & Stamford Railway, Westchester Street Railway and the Shore Line Electric Railway, as well as bonds of some of the foregoing, and the gold notes of the New England Investment & Security Company.

New Publication in Nashville

The Nashville Railway & Light Company, Nashville, Tenn., is now publishing a monthly magazine called the *Rail-Light News*. The first issue was that of January and started the four-page paper on a successful life by giving just the news the members of the company wished to know.

The magazine not only sets forth the advantages of a laugh in a column adjacent to news of a safety contest and a story of the meaning of the Employees' Mutual Benefit Association but it also tells the latest gossip. He who is attempting to grow a mustache will find his name and his deed duly chronicled in the *Rail-Light News*. The publication is conducted for and by the employees of the Nashville Railway & Light Company and serves as a clearing house for their ideas and their problems.

Death and Destruction Follow Explosion

Seven Men Killed and More Than Score Injured in Compressor Accident in Kansas City

The air compressor tank in an isolated room connected with the machine shops of the Kansas City (Mo.) Railways exploded on the morning of Tuesday, March 7. As a result seven men were killed, an eighth man was seriously injured and twenty others were slightly injured.

The tank that exploded was the main tank used for supplying air in the shops; it was of 3-in. steel, 5 ft. by 20 ft., mounted on stanchions. It was attached to an Ingersoll-Sargeant compressor, equipped with safety valve. The tank had a 4-in inlet and a 3½-in outlet pipe. The tank was equipped with pressure gage and a safety release valve. In addition to these guards, there was an "unloader" connected with the pressure piston. This unloader operated automatically; but it also could be operated manually, in case of necessity. The compressor tank was operated under 110-lb. pressure.

TANK AND COMPRESSOR ISOLATED

The tank and compressor were located in a room by themselves, near the northeast corner of the one-story structure covering about 200 ft. by 400 ft. constituting the machine shops of the railway at Ninth Street and Brighton Avenue. The tank room was separated from adjacent rooms of the building by brick walls; there being only one door into it from the nearest machine shop room. Adjacent to the tank room was a two-story section of the machine shop structure, the second story being occupied by offices. The second story room of the part of this office section immediately contiguous to the tank room, was used for rest quarters for girls.

One employee had charge of the tank room. Although the compressor equipment was entirely automatic, and could be started in the morning and left unattended normally, this employee was

provided as an additional precaution against suspension of compressor service. This employee started the compressor, as usual, when the shops opened at 7:15 a. m., on March 7. He was alone in the room when the explosion took place eight minutes after starting. The walls of the tank room were shattered, both the outer wall of the room, and the brick walls separating it from the other parts of the shop. The compressor attendant was killed; the men injured were in the machine shop rooms adjoining. Part of the floor of the adjacent two-story

authorities within the past month in the usual routine of inspection.

The shops were in operation within two hours after the accident; tarpaulins were spread over the roofs, and car compressors had been built up in series to provide air for replacing the service of the destroyed tank equipment. The following morning the shops were working at 100 per cent of personnel; and the rebuilding of the tank room was in progress.

The property damage amounted to about \$20,000, chiefly to the adjacent parts of the building. Windows were



WALL WHICH SEPARATED THE TANK ROOM FROM THE ADJACENT SHOP ROOM WAS DESTROYED IN THE EXPLOSION

section fell, but nobody was in that section at the time.

The tank and fittings were destroyed; the only piece of apparatus of importance found to be intact after the explosion was the unloader valve of the pressure piston. This valve was still found to be easily workable with slight pressure.

The compressor equipment had been installed about ten years ago, replacing similar equipment that had operated without accident for the previous ten or fifteen years. The equipment which exploded had been rebuilt and overhauled just twelve weeks before the accident; it had been inspected by state

shattered in the entire shop building including all the skylights; and in some neighboring houses.

Engineers who have investigated the accident remark that evidently there must have been an extraordinary combination of disabilities in safety factors to produce the accident—one such possible combination in a million chances, when the various safety valves should simultaneously fail to function at a time when pressure reached excessive limits, and the warning of danger be so brief that the attendant could not himself trip a valve. The attendant had been employed solely in the compressor room for many years.



LOOKING INTO THE SMALL ROOM WHERE THE COMPRESSOR EQUIPMENT WAS LOCATED



LOOKING NORTH THROUGH THE TANK ROOM; ONE OF THE TANK STANCHIONS IS SEEN STANDING, ANOTHER LEANING FORWARD

Fight in Dallas

Railway and City Come to Open Disagreement on Six-Cent Fare and Excess Earnings Disposition

The Dallas (Tex.) Railway and officials of the city of Dallas have come to an open breach over the question of a 6-cent fare and what disposition is to be made of the excess earnings under the 6-cent fare. It has just developed that the Dallas Railway has been applying the excess in earnings over and above the authorized 7 per cent, as provided in the franchise, in paying dividends on the ground that the stockholders are entitled to a return of 7 per cent for the full time the company has been operating under the new franchise, or since October, 1917.

Mayor Sawnie Aldredge and members of the Board of City Commissioners take the position that the excess earnings of the company, earned under the 6-cent fare, granted on June 16, 1920, cannot be used in paying dividends, but must be expended in improvements and betterments, inasmuch as the 6-cent fare was granted with this proviso and because the traction company declared it was not financially able to make certain improvements deemed by the city to be imperative.

The controversy over earnings arose when the Dallas Railway sought approval of a requisition calling for construction of a car line on Forney Avenue to be used by the Dallas-Terrell Interurban in entering the city. The City Commission took the position that the line on Forney Avenue should be built by the interurban company and leased to the Dallas Railway for local street cars, this being the policy in regard to other interurban lines entering the city. The city commissioners declared that the increased valuation by reason of the traction company's building the Forney Avenue line, and the fact that there would be no revenue from such investment, would tend to decrease the earning capacity of the company and would thereby tend to increase fares. This led to an investigation of the traction company's books, and then it was discovered that the excess earnings over and above the 7 per cent since the 6-cent fare was granted amounted to \$100,000 and that the traction company had paid out this sum in dividends to its stockholders.

Then, the Mayor wrote W. M. Holland, president of the Dallas Railway, advising him that such use of the earnings of the company neither legally nor morally justified and calling on him to have the stockholders place back in the company's treasury the sum of \$100,000 to be used in improvements and betterments as provided in the agreement under which the 6-cent fare was granted. The Mayor at the same time gave notice that the city would open and conduct a hearing on a proposal to reduce street car fares in Dallas to 5-cents.

Mr. Holland, president of the Dallas

Railway, took note of Mayor Aldredge's communication and departed for New York and Boston to confer with the owners of the Dallas Railway in regard to the situation and the possibility of the city forcing the traction company to return to a 5-cent fare. The hearing was set for April 6.

The statement issued by Mr. Holland admitting that \$100,000 in excess earnings of the company had been distributed in past-earned dividends since the 6-cent fare was granted in 1920 and making the proposal that the stockholders loan the company \$100,000 for improvements in part is as follows:

Dallas Railway will announce "ready" on April 6 on the 6-cent fare hearing. If assured of a reasonable return on their investment the stockholders are ready and willing to loan the Dallas Railway, with which to make necessary extensions, all amounts earned toward making good the deficit in the authorized return, by reason of which there is already available approximately \$100,000. The borrowing of this money by Dallas Railway will not increase the property value of the company until the money has been expended for such extensions.

The few weeks I have been connected with Dallas Railway (I assumed office Jan. 3) have convinced me that there are many rapidly growing sections of our city which are badly in need of street car extensions. It will be my policy as president, co-operating with the other officers and with the directors, to make these extensions just as rapidly as the finances of the company will permit. Such extensions should be made in the order of which they are most needed. The company, and I take it, the city, does not want investments made in unprofitable extensions, especially in view of the fact that there are profitable extensions which are badly needed.

I see no good reason why the city authorities and the street car company cannot agree as to which extensions are most needed, and the order in which such extensions should be made.

As an officer of the company and as a citizen of Dallas I am hopeful that our street car situation may be settled amicably and in a business-like manner. I know that such a settlement would be best for the company and best for the future growth and development of Dallas.

In reply to Mr. Holland's statement, Mayor Aldredge issued the following statement:

The street railway company claims that it was within its legal rights in so doing, claiming that the franchise permitted it to take this action. I do not believe this would be true, even if the road were operating under the franchise requirement of a 5-cent fare on account of the fact that the paving obligations are primary and paramount obligations under the franchise and take precedence over the authorized return or the reserve. But I would call attention to the fact that this \$100,000 was not earned under the franchise fare of 5 cents, but was derived from the excess profits of the 6-cent fare, which 6-cent fare was granted in order that the improvements could be made.

Certainly the street railway company cannot take the position that the Board of Commissioners is required to grant a 6-cent car fare in order to permit it to pay off all past losses, hence the action in appropriating the \$100,000 cannot be defended either legally or morally.

The street railway company's admission that the money has been paid out to the stockholders and the statement that the company might borrow it back from the stockholders is amazing. In other words, the officers have appropriated this money, but now propose to borrow it back from themselves and pay themselves interest on it, which would mean that the people of Dallas would be paying interest to the stockholders of the street railway company on this \$100,000, which belongs to the people of Dallas and not to the stockholders. Such a proposition is indefensible.

In good faith and good morals the street railway company should immediately cause to be placed back in their treasury this \$100,000, which has wrongfully been disbursed to the stockholders, and use the same for the improvements which the company is under obligation to perform.

Mexico City Strike Aims for Commission Control

Employees of the Mexican Light & Power Company, Mexico City, Mexico, are out on strike with the intention that Mexico City shall have no lights, no trolleys and no water. The Mexico Tramways Company, Ltd., with its subsidiaries, the Mexican Light & Power Company, the Mexican Electric Light Company and the Pachuca Light & Power Company, furnish the railway, power and light service of Mexico City and surrounding towns. The central power plant is at Necaxa.

Employees have endeavored to cut the transmission cable, but have thus far been prevented from doing so by government troops which guard the plant. Trolley service was discontinued on March 2, but water and light are still available and most of the business and residential buildings are lighted, although the streets are darkened.

The strikers are demanding that they be allowed to take over the power, light and street car systems and to operate them under a commission. Early in the strike a cable from Mexico City said that the British Consulate had been closed. London interests head the Mexican companies. This is generally thought to be due to the failure of the government to put an end to the strike.

These companies have had more or less continuous trouble during the revolutionary times in Mexico. In the latter part of 1914 Carranza captured Mexico City. Thereafter labor unions were formed which demanded that wages be raised 25 per cent, that all charges be approved by the unions, and that the company consent to certain operating conditions which would in reality subject the company to union control. The company refused the terms, whereupon the employees went out on strike and operation ceased.

Enough men could have been recruited to provide normal service, but no protection was forthcoming from the government and the danger without protection was too great. The Federal district, under order of the constitutional government, took over the operation of the systems and salaries were very shortly doubled or increased 25 per cent. Under this operation maintenance of track and rolling stock was almost entirely neglected.

In May, 1920, the roads were turned back to their owners, but the government paid no indemnity for the period of its operation.

\$10,000 for Safety Bonus

The San Diego (Cal.) Electric Railway distributed \$10,000 to platform employees recently in "safety checks." The fund is that left over from the accident fund after all claims for injury and damage had been settled. The amount of the check for each individual is based upon the number of hours of service of each employee. The amount of the checks averaged \$50 this year, while one man received as high as \$77.

Financial and Corporate

\$4,464,826 Loss by I. R. T.

\$10,511,002 Now Piled Up in Accumulated Deficits Over Three-Year Period

The Interborough Rapid Transit Company, New York, N. Y., in its annual report of operation during the year ended June 30, 1921, shows a deficit of \$4,464,826, as compared with a deficit of \$2,235,835 for 1920. Gross operating revenues for the year amounted to \$55,031,941, comparing with \$51,478,410 in 1920, an increase of \$3,553,530, or 6.90 per cent. This result was accomplished by a gain on the subway division of \$3,204,441, or 10.13 per cent and a gain on the Manhattan Railway division of \$349,088, or 1.76 per cent.

The gain in the revenue from the transportation of passengers was \$2,933,925, and the increase in the other street railway operating—principally from the sale of power—was \$619,604. Operating expenses for the year were \$36,024,646, as compared with \$31,695,208 the preceding year, an increase of 13.66 per cent, of which 20.19 per cent or \$3,667,816 was on the subway division.

COMPARATIVE STATEMENT OF INCOME ACCOUNT

Year Ended June 30	1921	1920
Gross operating revenue..	\$55,031,941	\$51,478,410
Operating expenses.....	36,024,646	31,695,208
Net operating revenue..	\$19,007,295	\$19,783,201
Taxes.....	2,735,694	2,623,410
Income from operation.	\$16,271,600	\$17,159,791
Non-operating income...	639,123	608,368
Gross income.....	\$16,910,724	\$17,768,159
Income deductions.....	21,375,550	20,003,995
Net corporate income for the year.....	*\$4,464,826	*\$2,235,835
Add:		
*Surplus, June 30, 1920 and June 30, 1919.....	\$7,093,100	\$10,152,092
Other credits.....	34,779	5,126
Totals.....	\$2,663,053	\$7,921,383
Appropriated for:		
Loss upon sale of Liberty Bonds.....	\$394,756	
Loss upon sale of real estate.....		\$809,190
Amortization, capital retirements and other charges.....	25,418	19,091
Total appropriations...	\$420,174	\$828,282
Profit and loss—surplus	\$2,242,878	\$7,093,100
*Deficit.....		

*Stated exclusive of accruals under Contract No. 3 and related certificates payable from future earnings.

The report indicated a net operating revenue of \$19,007,295, as compared with \$19,783,201 for 1920, a decrease of 3.92 per cent. This was the result of a loss on the subway division of \$463,374, or 3.44 per cent, and a loss on the Manhattan Railway division of \$312,532, or 4.94 per cent. The income from operation was \$16,271,600, a decrease of 5.17 per cent, as compared with \$17,159,791 for 1920, while non-operating

income stood at \$639,123, as against \$608,368 the preceding year. This increase of 5.05 per cent was explained by the increase of \$44,605 on the subway division, although non-operating income on the Manhattan Railway division decreased \$13,850 during the year, or 18.84 per cent.

Income deductions amounted to \$21,375,550, as compared with \$20,003,995 for 1920, an increase of 6.85 per cent. Details of the year's operation, as compared with 1920, are set forth in the accompanying table.

In his remarks to the stockholders President Frank Hedley said in part:

The number of passengers carried was 1,013,678,831, compared with 955,133,110 last year, an increase of 58,545,721, or 6.13 per cent, the result of a gain on the subway division of 53,287,147, or 9.02 per cent, and a gain on the Manhattan Railway division of 5,258,574, or 1.42 per cent.

The gain on the subway division reflects the increase in passenger business incident to the operation of the new lines constructed and equipped under Contract No. 3 and operated in connection with the old subway lines.

The sum of \$8,418,325 was spent during the year for maintaining the structure, roadway, power houses, electrical equipment and rolling stock in good operating condition. This sum included the renewal of rails on 2.5 miles of single track and 24,316 ties on the Manhattan Division and 13.92 miles of single track and 10,149 ties on the Subway Division; \$4,669,264 was spent for additions and betterments to the property.

Your property was operated during the last year at a loss of \$4,464,826, notwithstanding the practice of every economy it was possible to conceive. The net revenue, after the payment of operating expenses and taxes, was insufficient by this amount to meet the interest and sinking fund on the 5 per cent bonds and 7 per cent notes issued for construction and equipment of road in operation. This is the third consecutive year of accumulating deficits, the company having failed to earn its fixed charges in 1919 by \$3,810,339 and in 1920 by \$2,235,835.

The increase in the deficit this year over the year 1920 was caused by increased charges for operating expenses, taxes and for interest and sinking funds aggregating \$2,259,705 in excess of the increase in gross operating revenue for the year. These accumulated deficits totaling \$10,511,002.25 have so far as possible been taken care of by the application of the remaining surplus, the sacrifice of assets and the forbearance of our creditors, in order to keep the service going and avoid a condition of disintegration and chaos similar to that now existing on the surface lines.

Notwithstanding these deficits the growth of traffic has been continuous. In 1905 the subway and elevated lines combined carried 339,104,820 passengers. This number increased gradually with each year until 1921 these combined lines, including the recent additions, carried 1,013,678,831 passengers. In 1905 the number of passengers carried per mile of track was 2,214,634, while in 1921 it was 2,773,479, an increase of over 25 per cent in the face of an increase in the mileage of over 138 per cent. Since the opening of the new lines in the latter part of 1918, there has been an average increase of 81,000,000 passengers per annum. The present subway ramifications have more than reached their limit on a 5-cent basis and to attempt anything further would be entirely to disregard all economic laws.

First Dividend in Four Years

The directors of the Worcester (Mass.) Consolidated Street Railway on March 13 declared a dividend of \$2.50 a share on its preferred stock. This is the first dividend declared by the company in four years. It is payable on April 1.

United Traction Report Forecasts a Brighter Future

The report of the United Traction Company, Albany, N. Y., for the quarter ended Dec. 31, 1921, shows a more hopeful outlook for the return of this company to a normal basis. Although the operating revenues for the quarter ended Dec. 31, 1920, were \$227,290 more than in the same quarter for 1921 still the expenses for the 1921 quarter were decreased by the sum \$270,083.

The net deficit from railway operation in the last quarter of 1920 amounted to \$30,493 while in the last quarter of 1921 there was a net gain of \$12,301.

The traffic in the last quarter of 1921 increased considerably over the third quarter of the same year. The number of passengers advanced from 3,540,995 in the third quarter of 1921 to 3,824,574 in the last quarter.

The report submitted makes also a comparison of the entire year operation against operation in 1920. The effect of the strike is seen in a comparison of these figures. The total revenues for 1920 amounted to \$3,253,973 and in 1921 they were \$1,197,783. The net corporate income for 1920 was a loss of \$416,510 and for 1921 the railway company reported a loss of \$2,208,409.

Oakland Property Realizes Surplus of \$49,297

At the annual meeting of the stockholders of the San Francisco-Oakland Terminal Railways, Oakland, Cal., which was held in the company's offices on March 7, 1922, W. R. Alberger, vice-president and general manager, said, among other things, that the general business depression of the year 1921 had not materially changed the company's condition and that it was in practically the same position at the end of that year as it was at the close of the year 1920. He stated further that better service had been provided in 1921 than during the previous year by putting more cars in service, which increased the car mileage from 16,849,400 in 1920 to 16,887,649 in 1921 and that the improved service caused an increase in car-hours from 1,672,865 in 1920 to 1,684,088 in 1921.

The company's gross operating revenue amounted to \$6,872,597 and operating expenses were \$4,853,032. The final surplus of the year was \$49,297. It was stated that the revenues of the company for the year 1921 compare favorably with those of the previous year, regardless of the fact that certain decreases were suffered by the gradual closing down of the shipping industry and the general downward trend of business during 1921.

The stockholders were informed that the federal, state, county and Municipal taxes for the year 1921 increased 14.75 per cent as compared with the year 1920 and that the increase was practically all due to taxes paid the State of California.

Mitten Men Elected

Bolting Directors All Deposed at Annual Meeting of Stockholders on March 15

Thomas E. Mitten had it all his own way at the meeting of the stockholders of the Philadelphia (Pa.) Rapid Transit Company on March 15. The entire slate of directors sponsored by him was elected to the board. The vote was overwhelming. In fact, it was unanimous, as the opposition chose to remain silent. It was the largest vote ever cast at any election of the stockholders. All of the 520,637 shares voted were in favor of the Mitten slate. There are 600,000 shares outstanding. This reduces to figures the measure of the Mitten victory. Thus another important step was taken in the policy of management and men toward the perfection of which Mr. Mitten has been working ever since he took hold of the property more than ten years ago.

The slate of directors as now constituted consists of T. E. Mitten, W. C. Dunbar, G. A. Richardson, C. J. Joyce, H. G. Tulley, Nelson Robinson, John W. McElroy and Dr. A. A. Mitten. Mr. McElroy and Dr. Mitten represent the employees on the board. Mr. McElroy is the president of the Employees' Co-operative Welfare Association. Dr. Mitten is the understudy of Mr. Mitten in the co-operative welfare work.

DIVIDENDS AHEAD

These briefly are the outstanding facts of the election. There is much more to the story, however, than the mere recording of names. It is the ideas behind the names that count and these as the management sees them are (1) service to the community; (2) management in the true interest of the security holders; (3) participation in the financial results achieved by the employees who make the results in dollars possible. If the hopes of President Mitten and his fellow co-operators are attained then after the payment of dividends of 6 per cent to the stockholders has been made for 1922 the employees will participate for their super-cooperation during the year in an amount not to exceed 10 per cent of the payroll.

There have of course been employee directors of electric railway companies before, but never before have the same elements of unity been combined as now in Philadelphia. The whole situation was, perhaps, summarized best by Mr. Mitten in a short speech which he made at the demand of the employee stockholders at the conclusion of the meeting. He said that the incidents of the meeting with its consummation in the election of the slate sponsored by him made quite worth while the eleven years of toil and effort which have marked his management of the property. The responsibility has been great, but he now recognized an added responsibility and was sure the men recognized it. Everything that had recently been said about the prospects for the future under the new order must be made good. A year ago the stock-

holders were told that the need existed for putting the property back into the very best shape following the retrenchment necessary during the war-time period. That work has in the main been carried out. The day for dividends was dawning. A great furore had been made in some quarters about one-man management. Mr. Mitten said there was no one-man management. There was, however, one-man leadership. In conclusion Mr. Mitten said that never would the employees regret their vote of March 15 if proper co-operation were continued with the management.

DIRECTORS OPERATING EXPERTS

These are the directors who will serve the company during 1922: T. E. Mitten, W. C. Dunbar, G. A. Richardson, C. J. Joyce, H. G. Tulley, Nelson Robinson, John W. McElroy, Dr. A. A. Mitten, the Mayor and two city directors, appointed by the City Council by virtue of the 1907 city contract. Mr. Mitten with four immediate associates, Messrs Dunbar, Richardson, Joyce and Tulley, representing the highest developed skill in their particular lines, as directors will also serve as the executive committee, reporting monthly to the board of directors. Mr. Dunbar is vice-president in charge of finance and accounting; Mr. Richardson is vice-president in charge of operation; Mr. Joyce is counselor to the company; Mr. Tulley although president of the International Railway, Buffalo remains the responsible head of the co-operative welfare activity in Philadelphia under the Mitten management. It is conceded that Mr. Tulley, perhaps more than any other man, is responsible for solving the labor problems of the P. R. T. Mr. Robinson is a capitalist and philanthropist. He has supported and backed Mr. Mitten in Buffalo and elsewhere since 1900 and is a believer in the Mitten policies and management. He has been a regular attendant at Mr. Mitten's meetings with his men during the ten years of struggle and accomplishment in Philadelphia. Brief sketches of Mr. McElroy and Dr. Mitten appear in the department "Personal Mention," elsewhere in this issue.

MEETING IN DEMOCRATIC SURROUNDINGS

As for the meeting itself it convened at 11 a.m., in the room of the Co-operative Welfare Association at the Luzerne carhouse. Of the mechanics of the meeting and the voting nothing need be said. There was a very large attendance. Although the great bulk of the voting was done by proxy a number of the employees insisted upon casting their own votes. Among the attendants were a number of ladies, among them Mrs. Rudolph Blankenburg, wife of the late Mayor of Philadelphia. Mrs. Blankenburg is a stout supporter of the Mitten policies. Only two of the bolting directors, Messrs Matthews and Tripple attended. They were conspicuous by their silence. The directors who were replaced were W. J. Montgomery, William Y. Tripple, Frank Buck, C. J. Matthews and W. J. Montgomery. The

men who replaced them were Dr. Mitten, Mr. Tulley, Mr. Joyce, Mr. McElroy and Mr. Robinson.

The deposed directors were reticent about making any statement after the meeting. Mr. Matthews, however, said:

We are through as directors. We made a pretty fight, and we came out the wrong end. We made no great appeal for support—we merely sent out our announcements and did not go further.

In view of the developments at the meeting the remark may readily be believed that was reported to have been made by one of the deposed directors that when Mr. Mitten had an idea he usually acted upon it thirty days before anybody else who happened to have the same idea at the same time.

Officials Ready to Discuss Separation of Properties

In his annual report W. Kesley Schoepf, president of the Cincinnati Traction Company, stated that the total number of revenue passengers carried on the Cincinnati Traction and Millcreek Valley lines for 1921 was 106,527,759. The previous year the total was 118,618,862. Estimates furnished the city officials indicate that the present rate of fare will furnish sufficient revenue to meet all expenses for the year 1922 with the exception of the amount necessary to pay the franchise tax.

Traction company officials, Mr. Schoepf said, were now ready to meet Mayor George P. Carrel's Committee to discuss readjustment and the separation of the properties of the Cincinnati Traction and the Cincinnati Street Railway companies.

President Schoepf declared that traction companies throughout the United States had experienced the worst slump in years. He also outlined a number of proposed improvements and said that consideration would be given to the "trackless trolley" this year in the suburban districts.

Announcement of Discontinuance Expected

It is generally understood in electric railway circles in Hartford that announcement may be made any time of the discontinuance of the interurban railway service between Hartford, Conn., and Rockville. Should the order be made, the Connecticut Company proposes to establish a half-hour service between the two places by means of surface cars. The interurban runs for most of the distance over the steam tracks of the New Haven Road. The Connecticut Company has threatened before to discontinue the interurban service, but the Public Utilities Commission has insisted that operation be continued.

Municipality officials of Rockville are protesting the abandonment of the service. It is contended by the Connecticut Company that the line is and has been for some time a losing proposition. That the line will be abolished is now almost certain.

Minnesota Commission Concludes Hearings in First City Railway Case

Valuation Estimates Presented by Engineers for Company—Cost of Power Contract Item of Value

On Feb. 28 at St. Paul attorneys submitted oral argument in the Duluth Street Railway valuation and fare case, now under consideration by the Railroad & Warehouse Commission of Minnesota. As this is the first street railway valuation and rate case to come before the commission, the de-

confronting practically all other electric railways, viz., the necessity of obtaining new capital for extensions and improvements of service with existing low market prices on electric railway securities and inability of the company to earn sufficient net to justify issuance of additional securities under the terms of their trust deed.

The evidence was submitted in hearings at Duluth and St. Paul during January and February, at which time A. L. Drum & Company, consulting engineers, Chicago, submitted a report on the cost of reproducing and developing the property of the Duluth Street Railway. An inventory was made of the

ply the railway was obligated to retain its own power plant as a stand-by plant from September, 1907, when the power company first delivered power until the power company released the railway from this item of the contract and the plant was sold in 1916.

The railway was required to pay the insurance taxes and interest on the plant from 1907, as well as suffer the loss of the investment in the plant (less salvage) at the time of abandonment. These items, constituting the actual expenditures of the railway in obtaining the power contract and perfecting a satisfactory source of power supply, were ascertained and reported as the value of the power contract.

Mr. Drum testified that the item of developmental costs represented a measure of the developmental and going concern value and indicated the costs that have been or would be encountered in creating and developing the property to its present state of efficiency. The expenditures for obsolete equipment and construction represent the capital included in the development of the property which has been superseded and replaced prior to the expiration of its useful life. The cost to unify the system represents an estimate of the cost incident to creating and consolidating the various companies into one system, now comprising the Duluth Street Railway Company, Duluth Division. The item included for loss of interest during operation represents the estimated deficit of return on the investment during the early period of operation up to the time the business had become established on a paying basis, which loss was estimated to be equivalent to one year's loss of interest of 8 per cent on the investment.

Mr. Drum also submitted the accompanying table, showing an estimate of the operating income for the year 1922 based on different rates of fare, with allowance made for decrease in passengers due to increase in fares.

THE DULUTH STREET RAILWAY, DULUTH DIVISION, ESTIMATED OPERATING INCOME FOR THE YEAR 1922

Based on Actual Passenger Fares and Revenue Car-Miles for the Year 1921.
Allowance Made for Decrease in Passengers Due to Increase in Fares.

	5 Cents	6 Cents	Rate of Fare 7 Cents Cash Six Tickets for 25 Cents	7 Cents	7½ Cents
Revenue passengers.....	27,200,000	26,112,000	25,568,000	25,024,000	24,480,000
Estimated decrease.....	None	4%	6%	8%	10%
Car-miles.....	3,300,000	3,300,000	3,300,000	3,300,000	3,300,000
Passengers per car-mile.....	8.24	7.91	7.75	7.58	7.42
Operating revenue:					
Passenger revenue.....	\$1,360,000	\$1,566,720	\$1,636,352	\$1,751,680	\$1,836,000
Other operating revenue.....	14,000	14,000	14,000	14,000	14,000
Total operating revenue.....	\$1,374,000	\$1,580,720	\$1,650,352	\$1,765,680	\$1,850,000
Operating costs:					
Operating expenses.....	\$1,010,130	\$1,010,130	\$1,010,130	\$1,010,130	\$1,010,130
Depreciation.....	134,303	134,303	134,303	134,303	134,303
Taxes.....	80,464	106,304	115,008	129,424	139,964
Total operating costs.....	\$1,224,897	\$1,250,737	\$1,259,441	\$1,273,857	\$1,284,397
Operating income.....	\$149,103	\$329,983	\$390,911	\$491,823	\$565,603

cision is awaited with much interest, especially as this commission will not be hampered by earlier precedents of its own and will have the benefit of the more recent decisions of the leading commissions and courts, which are now taking a broader view of the valuation problem. The tendency of later decisions is to restore the credit of these essential utilities and eventually re-

Duluth Division of the property as of July 1, 1921, and the final report of the engineers estimated the cost of reproducing and developing the property on the following bases, a summary of these valuations being given in the accompanying table: (1) pre-war cost, using current prices as of the year 1915; (2) ten-year average cost, using average of prices for the ten-year

THE DULUTH STREET RAILWAY—DULUTH DIVISION
SUMMARY OF COST OF REPRODUCING AND DEVELOPING THE PROPERTY
AS OF JULY 1, 1921

	Pre-War Cost Prices Current Year 1915	Ten-Year Average Cost Prices 1912-1921	Present-Day Cost Prices Current June, 1921	Estimated Original Cost Prices Current At Date of Installation
Physical property:				
Cost to reproduce new.....	\$4,828,084	\$6,473,578	\$8,220,384	\$4,826,725
Power contract:				
Cost of power contract.....	379,542	379,542	379,542	379,542
Total.....	\$5,207,626	\$6,853,120	\$8,599,926	\$5,206,267
Developmental costs:				
Expenditures for obsolete equipment and construction.....	\$693,688	\$693,688	\$693,688	\$693,688
Cost to unify system.....	50,000	50,000	50,000	50,000
Loss of interest during operation....	386,247	517,886	657,631	386,138
Total.....	\$1,129,935	\$1,261,574	\$1,401,319	\$1,129,826
Total cost of reproducing and develop- ing the property.....	\$6,337,561	\$8,114,694	\$10,001,245	\$6,336,093

turn them to a normal basis as set forth in the recommendations of the Federal Electric Railways Commission, of which Charles E. Elmquist, formerly of the Minnesota Commission, was chairman.

In order that the commission might have full data as to this property in its first electric railway case the railway company made special effort to submit very complete evidence as to the valuation of the property, the earnings and the financial predicament of the company, which is much the same as that

period 1912 to 1921, inclusive; (3) present day cost, using current prices as of June 1921; and (4) estimated original cost, using prices in effect as of the date the various parts of the property were installed or purchased.

An interesting feature of this valuation was the method adopted for valuing the power contract. The company purchases all of its primary power from the Great Northern Power Company, an independent hydro-electric power company. During the development of this source of power sup-

Bondholders Seek Greater Part in Receivership

Changes under the receivership of the Toledo & Western Railroad have been suggested by attorneys who appeared in Judge John M. Killits court at Toledo, Ohio, to object to motions now on file to expend earnings for improvements to the property and new equipment. It is alleged that of the \$50,000 or more of earnings none has reached bondholders. The bondholders will seek representation in the receivership. They also ask that the court order payment in full of all stock subscribed for at the time the road was built and through later financing.

Attorneys for the receivers, J. Frank Johnson, operating head, and Harry Dunn, of the Ohio Savings Bank & Trust Company, and attorneys representing bondholders and Henry L. Doherty & Company, were requested to get together on the matter and work out a plan to be presented soon to the court.

As Wall Street Sees It

Financial Authority Says Interests of Stock and Bondholders Are Cared For Under Commission Plan

The *Wall Street Journal* says that there appears in general to be no indications that a material disturbance of present security prices would attend upon the electric railways in New York accepting the Transit Commission's estimates of the values of the properties and assenting to the proposed plan of consolidation—an end which at present appears somewhat doubtful. Opening of negotiations with a view of accepting a plan in line with the commission's proposals may cause an appreciation in market values as strength of company claims develops in cases, for example, of companies having extensive non-operating property, valuable leases, and contractual obligations of potential value, such as preferential payment features of dual subway contracts, and large accruals payable from future earnings.

TITLE TO OPERATING PROPERTY TO BE VESTED IN CITY

It will be recalled that the commission proposes that companies vest title to their operating property in the city and take in return an equivalent in value of securities of a new company that is to be brought into existence. A further consideration shall be that companies, brought into a unified system and grouped in a manner prescribed by the commission, shall receive back new leases under which they will continue to operate privately but under the general direction of a Board of Control. New securities properly guaranteed are to be the sole basis of exchange, and it is for the purpose of making this exchange that valuations have been made.

The *Wall Street Journal* says:

The probability of interests of stockholders as well as bondholders being taken care of in the exchange is introduced by the plan of the commission which requires each company accepting the plan to take care of its own securities of whatever value, in its own way, and through a reallocation of new bonds among old security holders.

Property in Brooklyn Rapid Transit system which is useful for operation has been valued by the Transit Commission at \$154,608,677; securities of the system representing a par value of approximately \$227,000,000, had a market value on Feb. 16 around \$108,000,000. Operating property of Interborough system (I. R. T., Manhattan Railway, and New York Railways—the latter including Eighth and Ninth Avenue companies as well as New York & Harlem) are valued by the commission at \$261,476,046, while outstanding securities equal at par to \$497,000,000 have a market value of \$227,000,000. Commission values Third Avenue system at \$33,967,430, while securities at par approximating \$70,000,000 are appraised in the stock market slightly in excess of \$35,000,000. Commission's valuation did not include property of three subsidiary companies operating in Westchester County.

ESTIMATES BY BOTH SYSTEMS

In addition to evaluating operating property of all traction companies based on original costs less amount necessary to put each property in first class operating condition, which basis the commission's bureau of valuation recommended for use in making the exchange, the commission announced a valuation of all operating and non-operating property based on cost to reproduce

at 1921 prices less depreciation. Following are both estimates by systems:

Systems:	Valuation Recommended	1921 Prices Less Dep.
Brooklyn Rapid Transit...	\$154,608,677	\$194,756,352
Interborough Rapid Tran.	174,221,056	174,221,056
Original Manhattan Ry...	57,374,205	65,610,942
New York Railways (including 8th, 9th, and N. Y. & Harlem Railroad Co.).....	29,871,785	75,261,442
Third Avenue	33,967,430	57,207,122
Second Avenue R. R. Co.	4,798,317	8,889,364
Staten Island companies..	4,215,713	5,470,070
Queens Borough com.....	6,125,764	10,935,600
Miscellaneous companies.	497,207	716,061
Total.....	\$465,680,154	\$593,078,009

The *Wall Street Journal* says that the different bases of these estimates and the fact that non-operating property is included in one and not in the other, in some measure explains the difference in values for any system. Extent of accrued depreciation on the various systems also accounts for discrepancies as well as for lack of uniformity among the systems in relative differences between appraisals. Accrued depreciation on New York Railways property amounted to approximately 30 per cent of cost to reproduce; Third Avenue about 34 per cent; Manhattan Railway 25 per cent and Interborough 4 per cent. Percentages of non-operating property to total property varied from 14 per cent for New York Railways, 11 per cent for Queens companies and 6 per cent for Third Avenue, to 0 per cent for Interborough. Total of all non-operating property based on cost to reproduce in 1921 was \$36,968,820. A tabulation of the commission's appraisal of land owned by systems as of June 30, 1921, follows:

System:	Land Not Useful For Operation	Land Used For Operation
B. R. T.....	\$2,494,077	\$6,912,389
I. R. T.....	950,000	5,618,508
N. Y. Rys.....	2,460,800	9,474,600
Third Avenue.....	1,424,348	3,029,598
Second Avenue.....	84,000	565,000
Staten Island companies..	49,700	133,700
Queens companies.....	155,251	195,940
Total.....	\$7,618,587	\$25,929,735

Total property of all systems not used in operation, on basis of original cost less depreciation, is \$13,259,920, of which land (\$7,618,587) is the largest single item. Track and structures total \$4,239,309; electrical equipment \$1,014,236 and incidental expenses \$387,788.

Receivers Appointed

The Dayton, Covington & Piqua Traction Company, operating between Dayton and Piqua, Ohio, was placed in the hands of receivers on March 13, on application of the International Trust Company, Boston. The petition, which was filed in the Federal District Court at Dayton, cited that the traction company had defaulted in the payment of \$60,000 interest due on second mortgage bonds held by the trust company. The court appointed President Wert Kessler, West Milton, Ohio, and Vice-President T. Russell Robinson, Boston, as receivers. Company officials, pointing out that the company has been enjoying a good business, say that the trouble will be smoothed over without difficulty. The company has been operating the line for twenty-two years.

Financial News Notes

Same Officers Elected.—All officers and directors of the Pine Bluff Company were re-elected at the annual meeting of the stockholders and directors, recently held in Pine Bluff, Ark. Plans for the future were discussed but no definite program was decided upon.

Seven Per Cent Bonds on Sale.—Reilly, Brock & Company, Philadelphia, Pa., are offering \$150,000 of the Georgia Railway & Power Company's general mortgage 7 per cent bonds due Nov. 1, 1941. The bonds are offered at 101½ and interest to net over 6.85 per cent.

Ashtabula to Vote on Municipal Purchase.—At a special election on April 24, voters in Ashtabula, Ohio, will decide whether the city shall purchase the property of the Ashtabula Rapid Transit Company. The company owns 5.5 miles of track and leases 1 mile. It operates the Ashtabula & Lake Shore Railway.

\$7,500,000 Bonds Offered.—The National City Company, New York, N. Y., is offering \$7,500,000 of The Northern Ohio Traction & Light Company's general and refunding mortgage gold bonds Series A 6 per cent dated March 1, 1922, and due March 1, 1947. The price of the bonds is 96 and interest to yield more than 6.30 per cent.

Increased Capital Authorized.—Stockholders of West Penn Railways, Pittsburgh, Pa., have authorized the board to increase the capital from \$20,000,000 to \$30,000,000. The present capitalization is \$10,000,000 of common stock and \$10,000,000 of preferred. The new stock is to be common issued from time to time for corporate purposes.

Valuation Case To Be Continued.—The valuation case of the United Railways, St. Louis, Mo., was taken up again by the Missouri Public Service Commission on March 6, and after sessions lasting three days was continued until March 27. W. B. Bennett and F. W. Doolittle, consulting engineers representing the company, were examined at length. It is expected that testimony in the company's case will be concluded at the next hearing. The city will then be heard.

Detroit Bonds Offered.—Kuhn, Loeb & Company, Hallgarten & Company, and Kidder, Peabody & Company, New York, N. Y., are offering \$14,500,000 of the city of Detroit's 4½ per cent and 5 per cent bonds. Included in this amount is \$1,000,000 of 4½ per cent public utility bonds (street railway). These are coupon bonds dated Jan. 15 and July 15 and mature Jan. 15, 1932. The principal and interest are payable semi-annually, in New York City or in Detroit. These "street railway" bonds are offered at 100½ to yield approximately 4.40 per cent.

Traffic and Transportation

Subway Crowding Must End

New York Commission Apparently Prepared to Insist on Adoption of Its Own Standards of Service Irrespective of the Results Upon the Company Financially

The New York Transit Commission and the Interborough Rapid Transit Company are at the parting of the ways. At least the differences between them seemed to be irreconcilable at the termination of the hearing on March 15. The commission appears to be determined to require from the company a fuller measure of service than is now being given, while the company insists that it can only carry on successfully and avoid receivership by further indulgence from the commission. The members of the commission finally declined to adjourn the hearing on the traffic conditions for thirty days.

COUNSEL for the commission thought that body had been very tolerant, as tolerant as it could be, taking into consideration the public interest and all the other interests. The time had come, however, when a different policy must inevitably be considered by the commission. Recognizing that fact the commission, Mr. Shearn said, had done two things:

1. It had prepared a plan that would give relief and that would enable decent service to be given to the public, and at the same time take care of every dollar of real value that there was in these properties.

2. Contemplating the possibility that the companies were going to flout the commission's plan and disregard its tolerant attitude in the past, the commission proposed to exert its police power and require better service.

Mr. Shearn said the companies must face that situation and every day's delay spelled a continuance of indecent conditions.

Mr. Quackenbush, counsel for the company, entered a plea at the outset for the commission to let the matter stand over for a period of thirty days. He believed that the officers of the company would then know and be able to state to the commission whether they could reach any agreement with the Manhattan Elevated Railway with regard to securing modifications of the terms of the lease under which that property is operated by the Interborough. If the officers could be free for the next three weeks they would probably be able to do a great deal more than in a way would be helpful to the public than they could do if they were obliged to suspend all other things and take up the question of schedules and other intricate matters involved in rearranging the service.

Mr. Quackenbush said that he knew that he had made a pretty long speech but he felt he should state the thing thoroughly so that the commission would get the company's point of view about the matter. He said:

I will say to the commission as I have said to the Manhattan people, the Interborough Rapid Transit Company cannot under a 5-cent fare and existing conditions continue to pay the rental at the rate of 7 per cent. We hope that some adjustment

can be made that will enable us to go on. If the Manhattan Company should not see it that way or there should be no basis available for a compromise, then I should expect to say to Judge Mayer at the adjourned day as I would say to the commission, we can't go any further and we will have to face the inevitable.

Mr. Quackenbush then said that it was not reasonable to expect the Interborough to become familiar in so short a time with the valuation figures prepared by the commission. He called attention that the reports of the commission indicated that the deficit for the six months ended Dec. 31 was \$1,937,000, compared with a deficit for the six months ended Dec. 31, 1920, of \$2,682,000, and for the same six months of 1919 \$1,900,000. He explained that the deficit for the last six months of last year was about the same as two years ago and about \$682,000 less than in 1919. This gain, he said, had been made because the employees consented last July to accept a 10 per cent reduction.

COMMISSION COUNSEL WANTS GUARANTEES

Mr. Quackenbush assured the commission that he and President Hedley were anxious to co-operate in giving the public all the service possible, with the reservation that the company did not want to extend this service to the extent of forcing the company into a receivership.

Mr. Shearn asked Mr. Quackenbush if his company would guarantee that if it got the requested adjournment the service on the subways would be increased to the point attained in 1916, and Mr. Quackenbush replied that the question was a pretty big one. He did not know, he said, what were the standards of six years ago. Then Mr. Quackenbush said:

My disposition is not litigation. My disposition is candor. And if this commission will at any time make an order that is beyond our power to carry out, of course I shall take it into the Appellate Division and ask to set it aside. That is the best answer I can make. I cannot translate your inquiry into terms of money. We lay the whole facts before you. You can tell what this corporation can do just as well as I can.

I cannot underwrite the financial ability of the future, tomorrow or two weeks or thirty days from today of the Interborough Rapid Transit Company. It is in a perilous condition. I have made no concealment of it. The light seemed to be break-

ing a little for it. But if it escapes a receivership I think it will be due to the indulgence of this commission about as much as anything else. And, of course, any order of the character that you mention, Judge Shearn, would mean a receivership.

Mr. Shearn said that he asked the question, not that he expected any different answer, but to make it clear that the commission was really at the parting of the ways with the company in giving it further time in which to wrestle with the receivership problem. He then said:

The whole matter, as I see it, comes down to this. We are dealing not with a matter of a threatened receivership, but with the obligations of the Interborough Rapid Transit Company under its contract.

There was some controversy over the authority of the commission to exercise both its police power and its power over the company's contract with the city. Mr. Quackenbush said that if the powers were mixed he would ask the courts for a review of the matter. He insisted that if the commission intended to issue orders that would force the company into a receivership, it should so act as to leave an open path for the company into the courts, where a demand could be made for a review. In illustration of what he meant Mr. Quackenbush said:

I say, if the commission makes an order of the character which is indicated, I shall immediately cite the case of the International Railway in Buffalo, where the Court of Appeals said that you cannot make an order that disregards the financial ability of the corporation to carry it out. That illustrates what I mean.

Mr. Quackenbush said that whatever crisis existed in the transit situation several months ago had disappeared as soon as the holiday rush was over and conditions were no worse than three months ago, when there was no cry for increased service. He admitted that the service should be improved. Mr. Shearn, summing up the position of the commission, said that it was not concerned in the negotiations between the Interborough and the Manhattan companies, but that "the commission was concerned with the attitude of both companies with respect to its plan."

Service Reported to Be Suspended in Augusta

According to the New York *Evening Sun* of March 16 all electric cars in Augusta were withdrawn from service on that day by the Augusta-Aiken Railway & Electric Corporation as a protest against the neglect of the City Council to regulate jitneys. According to the newspaper report, the company had announced that its cars would remain in the carhouse indefinitely until the matter was settled.

A telegram to the management of the company in Augusta for confirmation of the report resulted in the suggestion that information could be secured from the J. G. White Management Corporation in New York, operators of the Augusta property. Inquiry at the office of that company, however, elicited the statement that the company was unaware whether the service had been suspended in Augusta or not.

One-Man Car and Denial of Bus Permits Approved

The committee appointed by Mayor Hackett of Albany, N. Y., to investigate the service rendered by the United Traction Company and to offer suggestions for its improvement has submitted its report. The Mayor made no comment on the report other than that he would probably recommend at the next session of the City Council that the provisions of the report be carried out.

Much of the report deals with the subject of the one-man car which the committee says it was at first opposed to, but after a very careful investigation it believes that the one-man car is here to stay and that "we should endeavor to co-operate with the traction company management to get a maximum of efficiency from this service." The committee expressed the opinion that with the one-man cars the United Traction Company could pay a fair wage to its employees and make a reasonable return to its stockholders on a 5-cent fare. The committee went further and said that Mr. Weatherwax had said that it was the plan of the company to reduce the fare gradually until it gets back to the 5-cent fare.

The committee favored no further permits for the operation of buses because it was of the opinion that bus operation interfered with the operation of the electric railway cars. Accordingly, numerous parking orders and restrictions were recommended.

Some further provisions were outlined on an increase in service such as through cars to carry West Albany workmen. Patrons of the United Traction Company were urged to purchase tokens. In concluding its statement the committee urged co-operation by the public and recognized the traction company's efforts to give the citizens of Albany a satisfactory service.

Higher Court Rules Against Increased Rates

The Ohio Traction Company is barred from increasing fares from Wyoming, Ohio, to the Zoological Garden from 5 to 7 cents for adults and from 3 to 3½ cents for children, in an opinion handed down by the Ohio Supreme Court. The case was taken to the Supreme Court by Attorney Henry B. Street, Solicitor of Wyoming, through the Court of Appeals from the Court of Common Pleas of Hamilton County in which a decision was rendered in favor of the traction company.

The contention raised by Attorney Street against the suit filed by the traction company was that a franchise contract was still in force between Wyoming and the Ohio Traction Company, signed in March, 1900, and valid for twenty-five years. The franchise provides for a 10-cent fare from Wyoming into Cincinnati and a 5-cent fare from Wyoming to the Zoological Garden.

The issue upon which the traction company based its prosecution was a

franchise entered into between it and the city of Cincinnati, one clause of which provided that the same rate should be charged by traction lines entering the city as those operating within the city. The Ohio Traction Company therefore sought to raise the 5-cent fare to one nearly equal to that of the Cincinnati Traction Company operating within Cincinnati. The Cincinnati Traction Company is a subsidiary of the Ohio Traction Company. The Supreme Court decided that the franchise contract existing between Wyoming and the Ohio Traction Company was complete in itself and could not be affected by any extraneous contract.

One-Man Cars Approved

One-man cars, as developed and operated by the Washington Railway & Electric Company, Washington, D. C., are to the interest of safety and economy, in the opinion of the Public Utilities Commission of the District of Columbia. The attitude of the commission was made known in the findings of the rate case of the Washington Railway & Electric Company and the Capital Traction Company. The commission's finding approves the recent devices used, as a conspicuous handle for opening each of the doors when released in emergency and two extra lights over the doorways which are lighted when the doors are opened. The order for the ventilation of cars is based upon that which would be adequate for a lightly loaded car, with a provision for further ventilation as required. Temperature of the cars, between Nov. 1, and April 1, shall not fall below 40 degrees F.

Petition Reduction in Salt Lake City

A petition for a reduction of the fares charged by the Utah Light & Traction Company, Salt Lake City, to the pre-war scale, has been presented to the Public Utilities Commission. The cash fare has been raised from 5 cents to 7 cents, the commutation ticket from 4 to 6½ cents and students tickets from 3 to 4 cents since 1917.

The petition states that the commission held these increases justified on the ground that all materials, such as ties, steel rail, equipment and copper, as well as wages, had increased in price until they had become abnormally high.

It further points out that during the past year there has been a decided falling off in the prices of all commodities; ties have dropped in price from 25 to 40 per cent; steel rails from 10 to 25 per cent; copper wire from 25 to 50 per cent, and there has been a general reduction in the cost of all materials used by the company. On May 1, 1921, the wages of the employees of the company were cut 10 to 16 per cent, at a saving to the company of at least \$120,000 per annum the petition concludes.

Davenport Mayor Wants Five-Cent Fare

Mayor C. L. Barewald of Davenport, Ia., candidate for re-election on the democratic ticket, announced recently that he would work for a 5-cent fare if re-elected. The present fare in Davenport is 8 cents. Mayor Barewald announced that he does not favor the monthly identification plan offered by the Tri-City Railway. By this card plan the passenger pays 50 cents a month for a card and then pays a nickel cash fare. The passenger who does not have a card pays a straight 10-cent fare. Four tokens may also be purchased for 35 cents or a fare of 8½ cents a ride.

This card plan went into effect on March 1 on the lines of the Tri-City Railway in Illinois, serving the towns of Rock Island and Moline. President B. J. Denman of the company reports that it is working well there and states that the sale both of identification cards and of tokens has gone beyond expectations.

City Restrained

Little Rock city officials have been restrained from putting into effect an ordinance recently passed reducing the fare there to 5 cents by an order issued by Federal Judge Jacob Trieber. The order preserves the status quo in the suit of the Little Rock Railway & Electric Company against the city, asking temporary injunction against the enforcement of the ordinance. The order is effective until March 27 when a hearing on the company's application for the injunction will be held. Meanwhile the company will continue to collect the 6-cent fare. Under the order attorneys for both sides are required to furnish the opposing side with copies of all schedules and data to be submitted at the hearing. Judge Trieber announced that if the injunction is granted it will be under the terms that the company will be required to issue 1-cent certificates for each 6-cent fare paid, the certificates to be redeemable in the event a permanent injunction is denied.

Wants Lower Fares.—As a part of the fight in Fort Worth, Tex., for reduced electric railway fares, petitions have been presented to the Mayor and City Commissioners asking that the city ordinance prohibiting the operation of jitney buses within the business district be rescinded and that the car fare be reduced from 7 cents to 5 cents for adults and from 3½ cents to 3 cents for children and students. The situation in Fort Worth has remained in statu quo awaiting final decision in the Galveston street car fare case, which has been taken before the Supreme Court of the United States, and it has been announced that the city will do all in its power to force a reduction in fares, but that no action can be taken until the Galveston case is decided.

Circuit Court of Appeals Hears Louisville Dispute

The dispute between the city of Louisville, Ky., and the Louisville Railway over the company's action in raising the fare from 5 to 7 cents had the attention of the United States Circuit Court of Appeals at the opening of the March session of that tribunal at Cincinnati, Ohio. The side of the city was presented and argued by Joseph S. Lawton and that of the company by Churchill Humphrey. The case was submitted for decision. It is before the court on the appeal by the city against the injunction granted by Judge Evans of the Louisville Federal Court stopping the city authorities from passing legislation to compel the traction company to reinstate the 5-cent fare. Attempt was made months ago to have the Supreme Court pass upon some questions bearing on the dispute, but the court refused to intervene and the decision was left to the United States Circuit Court of Appeals.

City Asks for Rate Rehearing

A petition has been filed by the city and county of Denver asking for a rehearing of the rate case of the Denver (Col.) Tramway recently decided by the United States Circuit Court of Appeals of the eighth district at St. Louis, Mo. Denver's right to contract through franchise is insisted upon and the court is urged to withdraw its decision which sustained the finding of the Federal District Court of Colorado and which is the authority of the receiver of the Denver Tramway for the collection of the present 8-cent fare.

In their opening arguments the attorneys for the city frankly state there are some broad expressions in the opinion of the Circuit Court of Appeals in this case which are so far reaching in effect that they not only would nullify the fare provisions in the franchises in the instant case but which rulings would seriously affect other franchises now in force in Denver and other parts of the state and seriously interfere with the making of franchise contracts in the future.

Court Decision Helps Railway

The Supreme Court of New Jersey has handed down a decision affecting the operation of jitneys within the state which is of importance to Public Service Corporation of New Jersey.

The Legislature of 1921 passed an act placing jitneys under the jurisdiction of the Public Utilities Commission, but made an exception of those licensed prior to March 15, 1921. The Public Utilities Commission assumed the position that under the act it had no power to prevent the transfer of jitney licenses granted prior to March 15, 1921. The Public Service Corporation of New Jersey took exception to this position and appealed to the Supreme Court. In a decision rendered recently the court overruled this contention and said the

transfer of a jitney license is practically an application for a new license and should the jitney be considered unnecessary the license can be refused.

The jitney owners have been selling their licenses indiscriminately and purchasers claimed the privilege to operate under them and that the commission could not prevent it, no matter whether the jitney was necessary or not. It is not known at present just what percentage of jitneys will be affected by the decision, but it is believed to be quite a substantial number.

Seeks Increased Rates

The Jersey Central Traction Company, Keyport, N. J., has asked the Board of Public Utility Commissioners for permission to increase the fare from 7 to 10 cents. The company in its petition claims that it is operating at a loss, the deficit for last year being \$120,000, according to Superintendent William H. Hitchcock. Mr. Hitchcock says that if the increase is not granted the matter of deciding whether cars will be run will be left in the hands of the executive offices of the company. The company operates from Perth Amboy to Red Bank and Highland Beach and to maintain its tracks alone is a great cost. At the present time the company is facing the problem of locating the tracks on Broadway, Keyport, and relocating the tracks on the bridge over the Raritan river between South and Perth Amboy. The company will also have to make other improvements that will cost enormous sums. The traction company was allowed by the commission to increase its fare on two occasions until it reached 7 cents.

Transportation News Notes

Freight Rates Cut.—The Buffalo & Lake Erie Traction Company, operating between Buffalo, N. Y., and Erie, Pa., has filed notices of 50 per cent cuts in freight rates on everything transported with the exception of bread, milk and newspapers.

Loading Time Cut in Half.—Time for loading passengers has been cut in half by the Georgia Railway & Power Company by means of street collectors stationed at the front end of cars. This double collection of fares in the downtown section made it possible for passengers to enter at both front and rear. Safety zones have been marked off in the congested district with ropes and wooden standards, and automobiles, as a result, can pass cars while passengers are boarding them.

Increased Fares Refused.—As a result of a rehearing granted the Westchester (N. Y.) Street Railway with respect to a fare increase, the Public Service Commission has denied the

application of Leverett S. Miller, receiver for the property. The present rates were fixed by the commission's order of April 7, 1921. In handing down the opinion Commissioner Semple said that although the revenues produced no fair return upon the company's investment, still they carried the operating expenses and up-keep as well as taxes with a trifle over.

Elevated Line for Brooklyn.—An elevated line, instead of a subway will be constructed for 2½ miles in Brooklyn, N. Y., from McKibben Street, near Bushwick Avenue, to a connection with the existing Brooklyn Rapid Transit elevated railroads at East New York. This follows a vote by the Transit Commission. Commissioner Harkness said that bids would be called for at once. The new line will relieve congestion at Canal Street and Broadway, Manhattan, by providing a route from that station in connection with the Canarsie line of the Brooklyn Rapid Transit.

Token Carriers for Sale.—A new token-carrier is going to be put out by the Connecticut Company, New Haven, Conn., which ought to do away with one of the main objections to the tokens, namely, the difficulty in handling and carrying them. This device, which is only an inch and a half long, holds ten tokens, five in each end, and the tokens, which are always in sight, are ejected one at a time by a slight pressure of the thumb. They are easily refilled. The company has not announced how it will sell the containers, but it is understood that they will cost only 5 cents.

Syracuse Fare Hearing Postponed.—The hearing of the complaint of the city of Syracuse, N. Y., against the New York State Railways on the one-man car operation and the 8-cent fare will be continued before the Public Service Commission on March 31. Evidence submitted by the company showed a net saving in operations from the one-man cars of \$70,758 from March 24, 1921, to Feb. 1, 1922. Savings for the present calendar year the company estimated would be \$107,758. Evidence was also submitted showing one-man cars were 93.2 per cent on time, while the two-man cars were 91.9 per cent on time.

May Prepare Lower Fare Ordinance.—The City Council of Pine Bluff, Ark., has appointed a committee of three aldermen to confer with officials of the Pine Bluff Company, looking to the reduction of fares. The present fare is 7 cents, while books of fifty tickets are sold for \$3. It is stated that an ordinance will be prepared and adopted, compelling the local company to reduce fares. The ordinance has been scheduled for presentation to the City Council on March 20. The 7-cent fare went into effect here during the period of the war. The Council believes that fuel and operating costs have been reduced sufficiently for cheaper fares to be put into effect.

Personal Mention

Employees Made Directors

Two New Members Elected to Philadelphia Board to Further Plan for Employee Co-operation

John W. McElroy and Dr. A. A. Mitten were elected directors of the Philadelphia (Pa.) Rapid Transit Company at the annual meeting on March 15 to represent the employees. Their election puts into effect one of the ideas of management and men toward which President Thomas E. Mitten of the company has steadily been working since he took hold of the property in 1911.

It was quite logical under the plan of employee co-operation with the management that eventually employees representing the rank and file should sit on the board and that these two men should be elected to the directorate. Mr. McElroy is president of the Co-operative Welfare Association and Dr. Mitten is secretary of that body.

It may be true that Mr. McElroy expressed great surprise to the daily newspaper men after the meeting on March 15 that he had been elected, but it seems quite unlikely. Mr. McElroy is a modest, retiring man, and the truth would seem to be that these qualities in him, of which there was unmistakable evidence in his talk with the representatives of the *ELECTRIC RAILROAD JOURNAL* by whom he was interviewed, were taken by the daily newspaper men to mean an expression of surprise. He has been with the company since 1913 and is at present a yard man. He was born in Philadelphia forty-five years ago. He was educated in the public schools there and at the age of thirteen went to work in the mines as a breaker boy. Later he worked for the Newton Coal Company in Philadelphia.

As a new employee of the company Mr. McElroy entered at once heartily into the work of the Co-operative Association and has been a representative of the way department with the association since April, 1919. In 1920, 1921 and 1922 he was on the general committee of the association representing the way department and is a trustee and member of the organizing body of the Co-operative Welfare Association Saving Fund. He was elected president of the Co-operative Welfare Association in January, 1922. In this last capacity he helped to draw up the by-laws of the savings fund. The employees collectively own more than 30,000 shares of stock and the savings fund of the employees contains \$1,000,000 of Philadelphia Rapid Transit bonds and car trusts. Mr. McElroy will be the responsible spokesman along with Dr. Mitten on the board of directors for the men owning these securities and will be held to accountability by them. He knows the men

and their problems from close contact and thus will be able to reflect by his action on the board their hopes and aspirations.

Dr. Mitten is the only son of President Mitten. He is thirty-three years old. He was educated as a physician and surgeon and attained great proficiency as a hospital surgeon. He entered the electric railway industry as an industrial surgeon in Milwaukee in 1915. He served as captain of an ambulance company in France, was twice gassed, was wounded and then captured in August, 1918. Dr. Mitten was imprisoned at Villingen until the armistice. He is the understudy of President Mitten in co-operative welfare work. He has a particularly keen appreciation of the problems of the employees on account of his intimate contact with the men and as a result of his service abroad, where he gave unstintingly the best that was in him to his fellow men engaged in the struggle for military supremacy.

Promotions Announced by Virginia Company

The Virginia Railway & Power Company, Richmond, Va., has announced that beginning March 1, Herman Pollard, superintendent of schedules and inspections, assumed the duties of superintendent of transportation. He also has general supervision over all car operations. H. L. Smith, formerly superintendent of the Richmond Division, is now superintendent in charge of operation of cars from the Reservoir carhouse and in charge also of employees of the Reservoir terminal office. W. F. Bryce, who has been superintendent of the South Richmond and Interurban Divisions, has been placed in charge of operation of cars from the South Richmond carhouse and also in charge of the Seventh and Perry Streets terminal office employees.

J. M. Penick, engineer of maintenance of way, has been made chief engineer of railways, and in addition to his former work has general supervision over carhouses and shops.

Other changes in the personnel of the railway are as follows: W. J. Hicks is now master mechanic and J. F. Pond, superintendent of the Petersburg city lines.

Claus Spreckels Is Manager

Claus Spreckels, son of John D. Spreckels of the Spreckels transportation companies, has been made general manager of the San Diego Electric Railway, Point Loma Railway and San Diego & Coronado Ferries Company. William Clayton, who has been the managing director of the transportation companies under the control of the Spreckels, has retired.

C. S. Banghart Honored

General Manager of Augusta-Aiken Railway Nominated for President of Rotary Club

The many friends of Charles S. Banghart will not be surprised to learn that his executive ability and attractive personal qualities have already been recognized by his fellow citizens in Augusta, although it was only two years ago that he went there to become general manager of the Augusta-Aiken Railway & Electric Corporation. The nominating committee of the Rotary Club of that city has placed his name at the head of its ticket for officers for the coming year.

In commenting on this fact the *Augusta Chronicle* in a recent issue in its column, "Talking it Over," said:

That is fine that Charlie Banghart is to be president of the Rotary Club for the next term of office. His nomination was announced yesterday, and the nomination is really the election.

Than Mr. Banghart no man who has come to Augusta to make his home has made more friends. He is held in the highest and most cordial esteem by everyone who knows him. He is a man of the highest order of ability, thorough in his line, a hard fighter and a fair fighter for the interests he represents, and kindly and courteous at all times and in all things.

The Weekly Letter of the club for March 5 said in part:

Although the head of the largest concern in Augusta employing strictly manpower, Charlie has always been democratic. He has always been approachable. He has never lost his sense of fun even in the most annoying moments of the railway controversy.

Some time ago Mr. Banghart talked on the traction situation before the Kiwanis Club, answering ten questions or charges sent to him in advance by interested persons. These questions were not easy ones and placed the burden of proof upon the company, but Mr. Banghart was convincing in his answers. The questions were as follows:

It is said the Augusta-Aiken line is bonded for \$6,200,000. Is it not more than the property is worth?

Is not the Augusta-Aiken trying to pay dividends on watered stock?

Why didn't the Augusta-Aiken run its tracks into the camp and buy more cars when it had an opportunity to increase its earnings?

Why is the Augusta-Aiken asking an increase in power rate, when commodities are coming down?

Why is it the Augusta-Aiken runs old, dirty, dilapidated noisy cars, operates on poor schedules, and charges a higher fare than is charged in Savannah or Atlanta?

It is said the Augusta-Aiken cares nothing about the welfare of Augusta—only what they can get out of it!

Why did the Augusta-Aiken ignore Council and the Railway Commission and take its case to the Federal Court?

Why should not the Augusta-Aiken put its wires under ground? Is it not a contract with the city?

The Augusta-Aiken will not move its tracks on Walton Way, or the Hill!

The Augusta-Aiken pays large salaries to men in New York who do no work!

Mr. Banghart was made general manager of the Augusta-Aiken Company in 1919. From 1914 until that time he served as vice-president and general manager of the Binghamton, (N. Y.) Railway. He is a graduate of Lehigh University and has been connected with the Interstate Railway, Reading, Pa., and the New York & Queens County Railway, Long Island City, N. Y.

General Bancroft Dead

To Him Much Credit Is Due for the Model System Which Boston Now Enjoys

General William A. Bancroft, lawyer, former Mayor of Cambridge, Mass., and first president of the Boston Elevated Railway, died on March 11 at his home in Cambridge. He was sixty-seven years old.

General Bancroft assumed the duties of president of the elevated at its inception in 1899. Under him none of the functions of the company as a transportation agency was neglected. With the program of physical extension carried forward under him there also went forward the work of building up the personnel and of cultivating public good will. Thus the Boston Elevated was one of the first companies to raise its standards for men seeking employment. Discipline was also strictly enforced, a reflection no doubt of the military training of the General himself. The humanitarian side was not neglected, however, for the Boston company was one of the first to adopt the pension plan and to award bonuses at Christmas.

As for the physical side General Bancroft took hold of a system that at the end of 1898 contained 316 miles of track, collected 181,321,295 fares and issued about 28,239 free transfers. Ten years later the system comprised 474.45 miles of track, over which 273,132,584 passengers were carried. The number of free transfers, under the provisions of law, increased by about 500 per cent in ten years. In 1916, when the general retired as president to become chairman of the board, the company carried 363,477,041 passengers, but the transfer burden had become unbearable.

General Bancroft's connection with the street railways at Boston began in 1885, when he was chosen to the superintendency of the Cambridge Railroad. When the Cambridge roads were merged in the West End Street Railway combination General Bancroft was made roadmaster of the entire system. He took part in the electrification of the lines, which was begun in 1889.

In 1892 General Bancroft left the railway business temporarily. His occupancy, however, of the mayoralty chair in Cambridge in the years 1893-96 was no interruption in his preparation for important public service work. He was a member of the Cambridge Common Council in 1882, of the Massachusetts Legislature in 1883-85 and was president of the Cambridge Board of Aldermen, 1891-92. He was a graduate of Harvard and captain and stroke oarsman of the victorious Harvard University crews of the years 1877, 1878 and 1879.

Service in the militia up to the time of and through the Spanish war must be accounted as an important part of the training which General Bancroft has undergone. He started as a private in the Massachusetts volunteer militia in 1875 and ended as a major general on the retired list in 1901.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

San Francisco Calls for Bids on Light-Weight Municipal Cars

As announced in the rolling stock columns of the ELECTRIC RAILWAY JOURNAL for Feb. 11, the San Francisco Municipal Railway has issued specifications and a call for bids, to be opened March 29, on twenty to thirty new light-weight cars for the Union Street line. These will be single-truck, semi-steel, double-end, center-entrance and center-exit cars of a design practically the same as the experimental car which was built especially for the Union Street line and described in the ELECTRIC RAILWAY JOURNAL, Jan. 29, 1921, page 229. If the bids received are low the order is to be placed for the maximum number of cars, but if prices are considered high only twenty are to be purchased at this time.

The specifications are issued in four parts, being devoted to bodies, trucks, motors and air brakes respectively. Trucks, motors and air brakes are to be delivered to the body builder, where the cars are to be completely assembled so they can be shipped practically ready for service. Delivery of the first fifteen cars is to be made at San Francisco 160 days after the contract is awarded and the remainder are to be delivered within sixty days thereafter.

Some of the main features of the specifications are as follows:

Length of car over bumpers.....	29 ft. 10 in.
Maximum width of car over window sill.....	8 ft. 8½ in.
Height from top of rail to top of trolley board.....	10 ft. ⅝ in.
Truck wheel base.....	12 ft. 0 in.
Diameter of wheels (steel).....	26 in.
Seating capacity, number of persons..	32
Number of motors.....	2
Horsepower of motors, one-hour rating.....	50
Scheduled speed, including stops, miles per hour.....	10
Minimum center radius of horizontal curves over which cars will be required to operate.....	40 ft.
Minimum radius of vertical curves over which cars will be required to operate.....	276 ft. 0 in.
Approximate weight of car body, including all equipment attached thereto but without passengers....	14,500 lb.
Approximate weight of truck including wheels and axles, exclusive of motors.....	7,500 lb.
Approximate weight of motors, 2,100 lb. each.....	4,200 lb.
Approximate weight of complete car empty.....	26,200 lb.

The San Francisco city engineer's office also has in course of preparation and expects to issue some time in April specifications for twenty cars of standard size and weight for use on the several new extensions to the Municipal Railway which are now planned.

Progress is being made on the several proposed extensions of the Municipal Railway. The Duboce Avenue line into the Sunset District has been approved by the Board of Supervisors

and the city engineer has been authorized to prepare details of an assessment district. The specifications for the Taraval Street line will be issued, it is expected, some time in March. Some of the material for the Masonic Avenue extension has been purchased.

Big Power Developments in the South

Many of the principal cities of North Carolina, South Carolina, Georgia and Alabama and in eastern Kentucky and Tennessee are now served by an interconnected power supply which rivals in territory served the proposed super-power district of the Northeastern Atlantic States. It extends from Nashville, Tenn., on the west to Goldsboro, N. C., on the east. Much new electric power equipment also is going into these and contiguous states. A list of some of the larger recent orders or additions to company equipment follows:

Southern Power Company.....	140,000 kw. hydro-electric
Alabama Power Company.....	60,000 kw. hydro-electric
Georgia Railway & Power Company.....	50,000 kw. hydro-electric
Alabama Power Company*.....	40,000 kw. steam
New Orleans Railway & Light Company.....	20,000 kw. steam
Smaller installations (aggregate).....	40,000 kw. steam
Total.....	350,000 kw.

*This includes steam equipment at Warrior taken over from U. S. Government the early part of this year and installed during the war.

Indiana Service Corporation Operates New Substation

The Indiana Service Corporation of Fort Wayne, Ind., has put into operation its new substation at the corner of Webster and Melita Streets, Fort Wayne. When completed with all feeder lines and special switches the cost will be in the neighborhood of \$130,000. The station is a one-story fireproof type of construction, laid out so that additions can be conveniently taken care of if wanted. The capacity of the rotaries used is 1,500 kw.

Metal, Coal and Material Prices

Metals—New York		March 14, 1922
Copper, electrolytic, cents per lb.....		12.875
Copper wire base, cents per lb.....		14.125
Lead, cents per lb.....		4.70
Zinc, cents per lb.....		5.037
Tin Straits, cents per lb.....		28.875
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.....		\$4.60
Somerset mine run, Boston, net tons.....		1.875
Pittsburgh, mine run, Pittsburgh, net tons		2.15
Franklin, Ill., screenings, Chicago, net tons		1.875
Central, Ill., screenings, Chicago, net tons		1.75
Kansas screenings, Kansas City, net tons		2.50
Materials		
Rubber-covered wire, N. Y., cents per lb....		5.90
Weatherproof wire base, N. Y., cents per lb.		15.50
Cement, Chicago net prices, without bags.....		1.94
Linseed oil, (5-bbl. lots), N. Y., cents per gal.		94.00
White lead, (100-lb. keg), N. Y., cents per lb.		12.25
Turpentine (bbl. lots), N. Y., cents per gal.		88.00

Rolling Stock

Boston (Mass.) Elevated Railway expects to purchase 100 new surface cars during 1922.

Brockton & Plymouth Street Railway, Plymouth, Mass., expects to buy two standard Birney safety cars.

Houston (Tex.) Electric Company plans to purchase thirty-five new cars immediately. The total cost will be \$270,000.

Louisville (Ky.) Railway has purchased 309 power-saving meters equipped with the car inspection dials from the Economy Electric Devices Company, for use on its city and inter-urban cars.

Atlantic & Suburban Railway, Pleasantville, N. J., has placed an order for new cars with the J. G. Brill Company, Philadelphia. These are to operate between Atlantic City and Somers Point. They will be of the pay-as-you-enter type.

Track and Roadway

City Railway, Dayton, Ohio, during 1922 will build 7,000 ft. of single track. All the material for the work is on the ground.

Carolina Power & Light Company, Raleigh, N. C., expects to build during the next few months 837 ft. of new track.

Pacific Electric Railway, Los Angeles, Cal., has received permission to construct a spur track railway across the north half of Philadelphia Street near Gregory Avenue in the City of Whittier.

Ottawa (Canada) Electric Railway during 1921 laid new rails on Wellington Street and on Somerset Street between Bank and Bay Streets. The new St. Patrick bridge was opened for traffic and the company's service resumed through to New Edinburgh.

Jamestown (N. Y.) Street Railway has petitioned the Common Council for permission to double track Prendergast and Spring Streets, between Third and Second Streets. It intends running cars on a loop system basis with the old Lyric Theater Building to be a terminal.

North Carolina Public Service Company, Greensboro, N. C., will maintain double car tracks on South Elm Street and will extend the double tracks on North Elm to the intersection of Church and Belmeade Streets. The City Council recently approved of this improvement.

Birmingham Railway Light & Power Company, Birmingham, Ala., will put in operation about Jan. 15 the Norwood car line extension. This new extension around the Norwood Boulevard to Thirty-Second Street and Fifteenth

Avenue is approximately a half mile long and will cost \$40,000 according to officials of the Birmingham Realty Company, which is financing the extension. Grading work has been completed and ties have been laid for that portion of the line on Norwood Boulevard. This extension has been referred to previously in the *ELECTRIC RAILWAY JOURNAL*.

Power Houses, Shops and Buildings

Brockton & Plymouth Street Railway, Plymouth, Mass., will purchase one 300-kw., 600-volt direct current converter.

Colorado Springs & Interurban Railway, Colorado Springs, Col., is building an extension to its office, 21 ft. x 75 ft. The cost is estimated at \$3,000.

The East Bay Division of the Pacific Gas & Electric Company, Sacramento, Cal., is to have a new office building in Oakland at Seventeenth and Clay Streets. It will be ready, according to present plans, before the end of 1922.

New Orleans Railway & Light Company is installing a 20,000-kw. turbo-generator in its Market Street power plant. A surface condenser of 33,000 sq. ft. will go with the auxiliary pumping and piping equipment. The work is being done by the Dwight P. Robinson & Company organization.

Boston (Mass.) Elevated Railway will purchase within the next few weeks two boilers for installation at the South Boston power station; build an addition to the boiler room at the South Boston power station, build a new inspection shop for elevated cars at Forest Hills, and at a later date will start work on the consolidated shops at Everett.

Franchises

Northern Texas Traction Company, Fort Worth, Tex., has been granted a franchise by the City Commission for extending a new line from Hemphill along Bowie Street to South Adams and thence south to Shaw Street. The new line will serve a densely populated portion of the Tenth Ward hitherto without service.

New Incorporation

Electric Railway Finance Corporation, London, Eng., has been registered with a capital of £500,000. It has a very influential directorate and first subscribers take a large part of shares. The company expects to carry out financial and commercial operations of every description, to carry on iron, coal and engineering business, to act as railway contractors, to manufacture railway materials and rolling stock and electrical apparatus and machinery.

Trade Notes

Service Motor Truck Company, Wabash, Ind., has announced the appointment of John D. Ristine as manager of sales in the Railroad Division.

Economy Electric Devices Company, Chicago, Ill., has designed a graphic form for use in plotting operating, statistical and engineering data. The company announces that immediate shipment can be made on this form.

The Car Turnstile Company, business offices at 383 West Fayette Street, Syracuse, N. Y., has been organized to market the Syracuse Car Turnstile system of controlling the operation of rear-entrance front-exit one-man cars introduced in Syracuse some time ago and described in the issue of Jan. 28. William H. Lawyer is president of the new corporation, and Albert C. Coon is secretary. It is reported that electric railway men from various cities have visited Syracuse to observe the system in operation.

Combustion Utilities Corporation, New York, N. Y., was organized at the first of the year, with headquarters at 60 Wall street. The company is composed of an old organization of Henry L. Doherty & Company, and the Industrial Heating Department. This latter organization grew out of the old Toledo Railway & Light Company, Toledo, Ohio. The new company will market what it calls fuel service, that is, it will analyze the customer's requirements, advise as to the proper fuel and furnace equipment, and after the installation, service engineers will work to gain the best results.

New Advertising Literature

Schweitzer & Conrad, Inc., Chicago, Ill., has issued Bulletin No. 105-A descriptive of its high voltage detector.

Henry Wells Oil Company, London England, has issued a third edition of a booklet entitled "Germ Process Motoils." This gives information regarding lubrication tests and other data of the company's oils.

The Uehling Instrument Company, New York, has just issued Bulletin Nos. 220 and 221, on combustion economies, which are the first of a series to be issued dealing with combustion and the cost of power. Bulletin No. 220 treats of the magnitude of the power plan chimney loss and gives a table showing the heat carried away by the chimney gases per pound of combustible. Bulletin 221 gives the relation between CO₂ and the money wasted up the chimney. Tables and graphs are included showing the per cent lost up the chimney for solid and liquid fuel and for gaseous fuel and examples are given of fuel saving, resulting from increasing the amount of CO₂.

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Compare this result with what you have to spend each year for maintaining inefficient worn-out hand brakes on your old cars.

Compare and capitalize this cost of repairs and you will find that an entirely new equipment of Peacock Brakes will save you enough in three years' maintenance to pay for themselves. Isn't it worth while to consider securing new hand brakes, when they pay for themselves so quickly? You needn't charge a cent to investment—a new equipment of Peacock Brakes can be a maintenance charge, spread over about three years.

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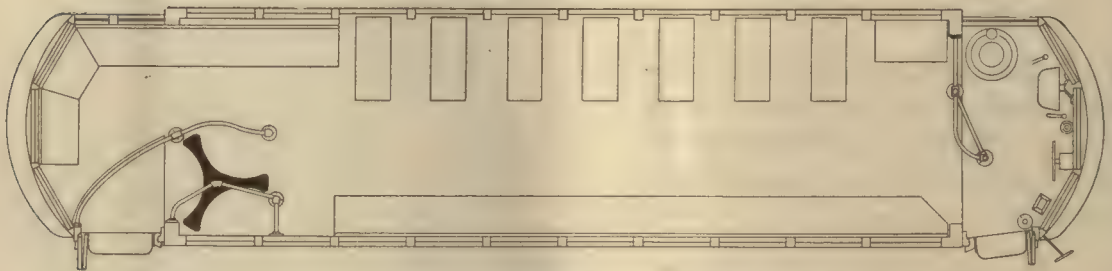
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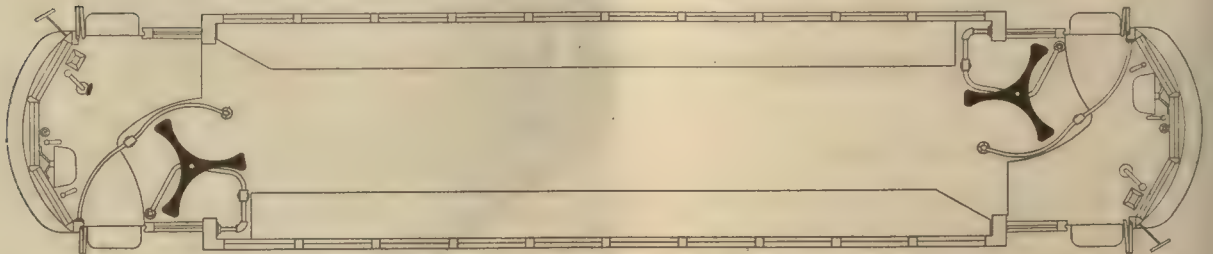
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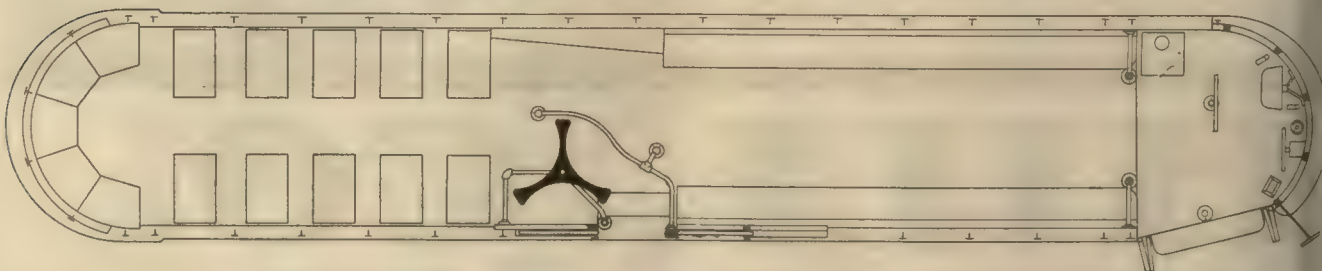
Syracuse Car Turnstile in operation on single-end, double-truck, one-man car, showing simultaneous loading and unloading at opposite ends. No Congestion



Syracuse Car Turnstile on single-end car. Note increased seating capacity at rear end.



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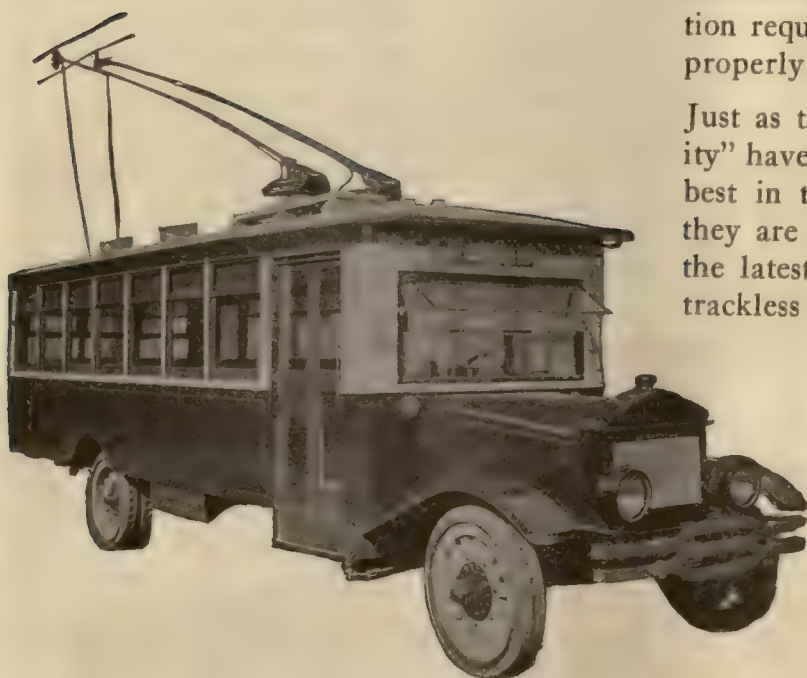
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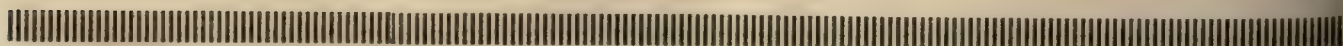
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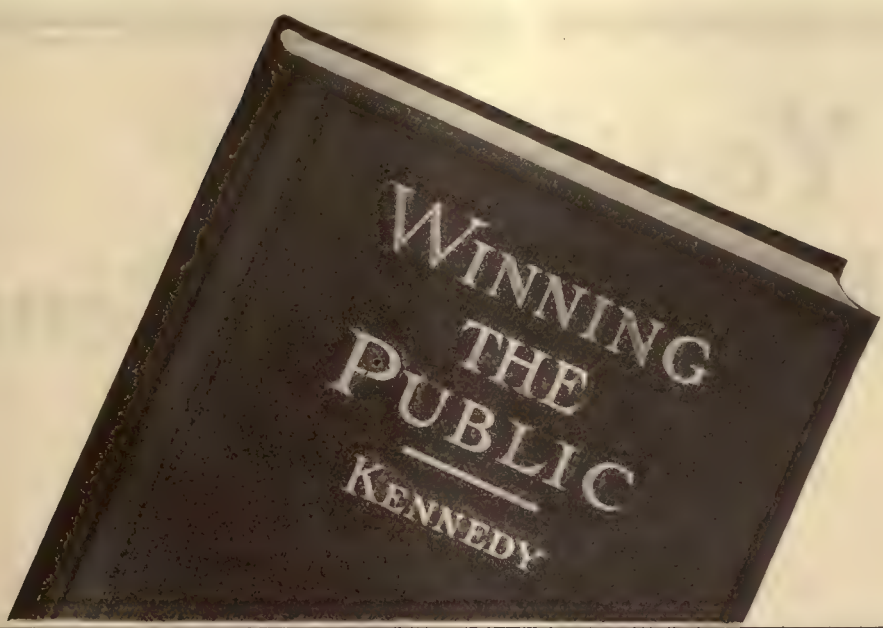
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The closer operators and manufacturers work together the quicker we shall mount the grade.

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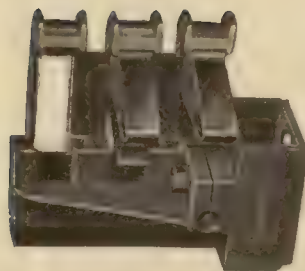
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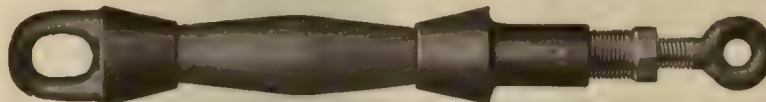
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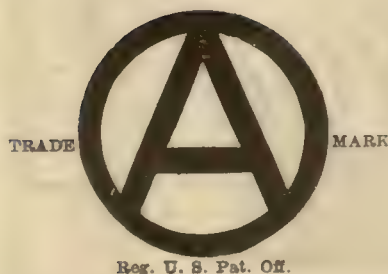
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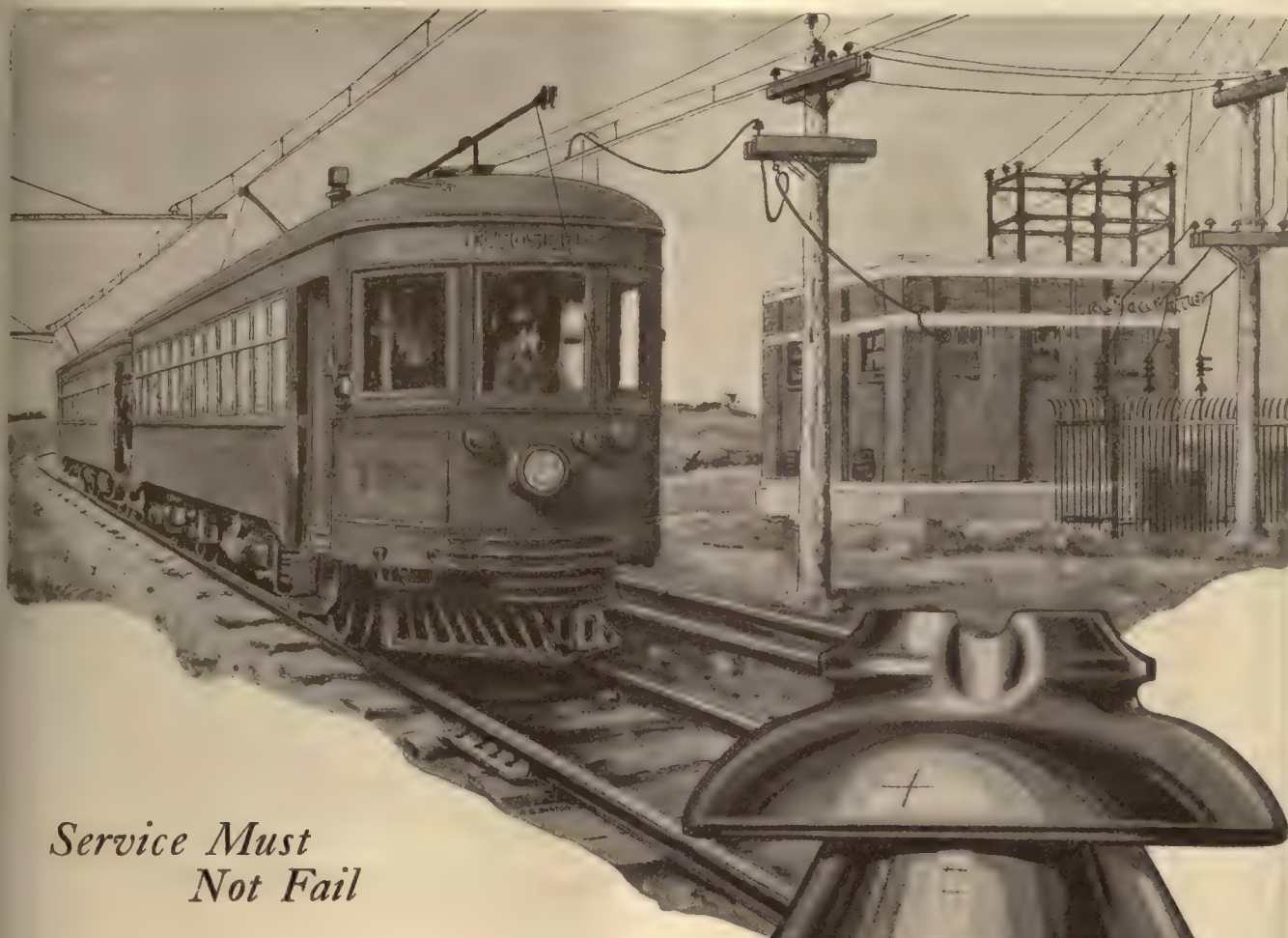
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Sole Agent for Dominion of Canada*

WHARTON TRACKWORK

WHARTON SPEC

NOW, while *costs* are *low* and *revenues* are *better*, is a good time to give thought to your special trackwork requirements for this year.



Home of WHARTON TRACKWORK

WHARTON Quality Special Trackwork—rugged and durable—is backed by over 60 years of experience, this company blazing the way in trackwork construction since 1859. In 1894 WHARTON introduced Manganese Steel Trackwork Structures, in which the well-known TISCO Manganese Steel was used.

With our large, well-equipped plants and organization, we are in a position to fill your needs efficiently.

Wm. WHARTON
EASTON

Sales Offices:

BOSTON, MASS.
CHICAGO, ILL.

DENVER, COLO.
NEW YORK CITY

PHILADELPHIA, PA.
PITTSBURGH, PA.

SAN FRANCISCO, CA
SCRANTON, PA.

TISCO MANGANESE STEEL

AL TRACKWORK



Home of TISCO MANGANESE STEEL

SWITCHES
MATES
FROGS
CROSSINGS
LAYOUTS
of
Manganese Steel
and all other
Constructions

TISCO Manganese Steel is manufactured by our parent company, the Taylor-Wharton Iron & Steel Co., High Bridge, N. J., (founded in 1742), who made the first Manganese Steel used in this country and who have specialized on Manganese Steel Castings since 1892.

Put your plans and problems before our experts. It is part of the *Wharton Service* plan to assist in every way possible, without obligation.

Wharton & CO., Inc.

PHILADELPHIA.

Other Plants:

TAYLOR-WHARTON IRON & STEEL CO., High Bridge, N. J.

PHILADELPHIA ROLL & MACHINE CO., Philadelphia

TIOGA STEEL & IRON CO., Philadelphia



A Thermit Insert Weld—Won't Cup in Service!

Your personal inspection of service tests is the most accurate method of determining the Best Track Joint.

Judge by actual *results*, not biased statements. The

Thermit Insert Weld

Wherever installed, whether under light or heavy traffic, speaks for itself.

Decide for yourself how Thermit welds have eliminated track joints and maintenance by inspecting the perfect condition of any of the miles and miles of Thermit-welded track already installed throughout the country, for long periods of time (in some cases over 9 years), especially those more extensive installations in Pittsburgh, San Antonio, Milwaukee, Indianapolis, Youngstown and Fort Wayne.

Proof from us is superfluous when Thermit users themselves volunteer such statements as that of an Engineer Maintenance of Way the other day, when he said, "You need not hesitate to refer prospective customers to us for reference."



Let us know the section number of the rail which you wish to weld so that we can ship welding material suitable for the purpose. On receipt of an order for material and apparatus, we will send an expert demonstrator to instruct your men so that you can carry on this work yourselves.

Send for our latest Rail Welding Pamphlet 3932.

Metal & Thermit Corporation

120 Broadway, New York

PITTSBURGH

CHICAGO

BOSTON

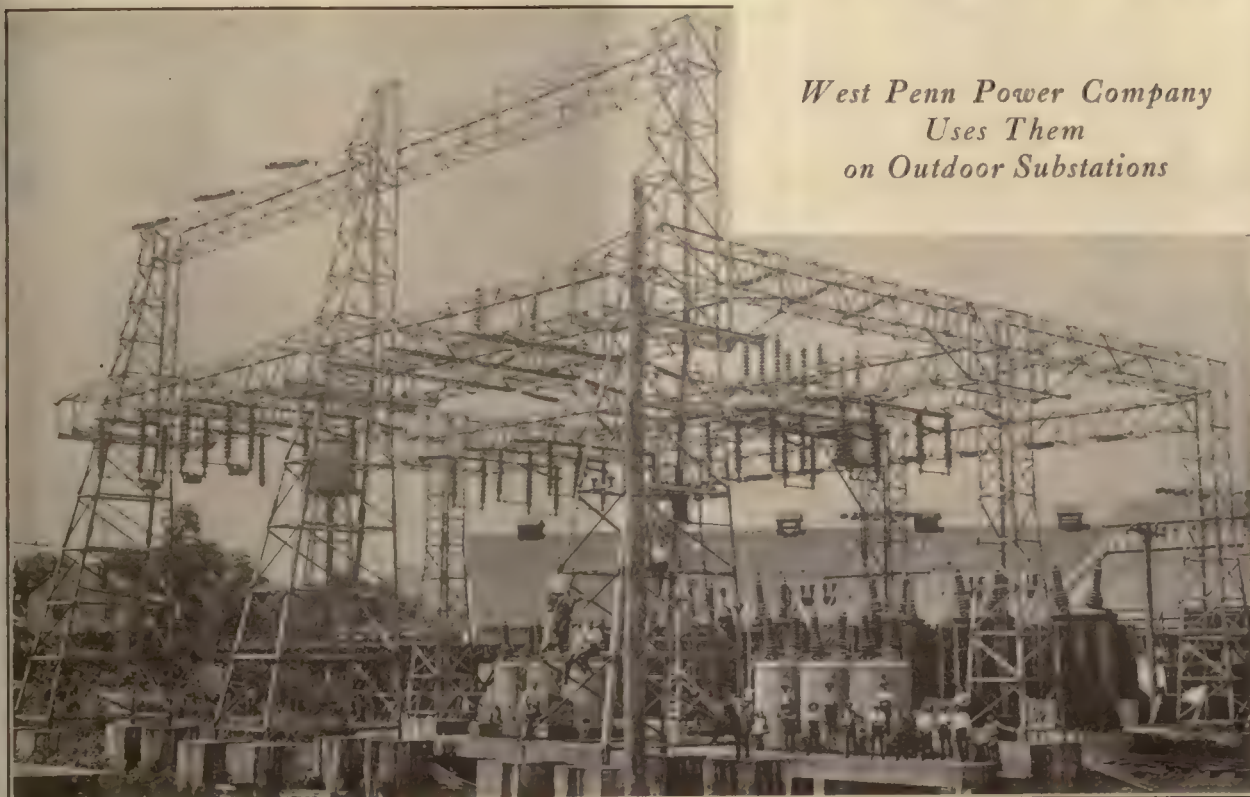
S. SAN FRANCISCO

TORONTO





DOSSERT CONNECTORS



*West Penn Power Company
Uses Them
on Outdoor Substations*

Washington (Pa.) Substation of West Penn Power Company

To Increase Sales of Transportation Service Must Be Reliable!

This requires positive, unfailing connectors in every electric circuit;
in other words,

DOSSERT CONNECTORS

For your outdoor substations, as well as feeder connections along the lines, for wiring in power plants, substations, and underneath the cars no soldered joint or other form can offer the dependability, economy in installation and efficiency in service which are so distinctly Dossert characteristics.

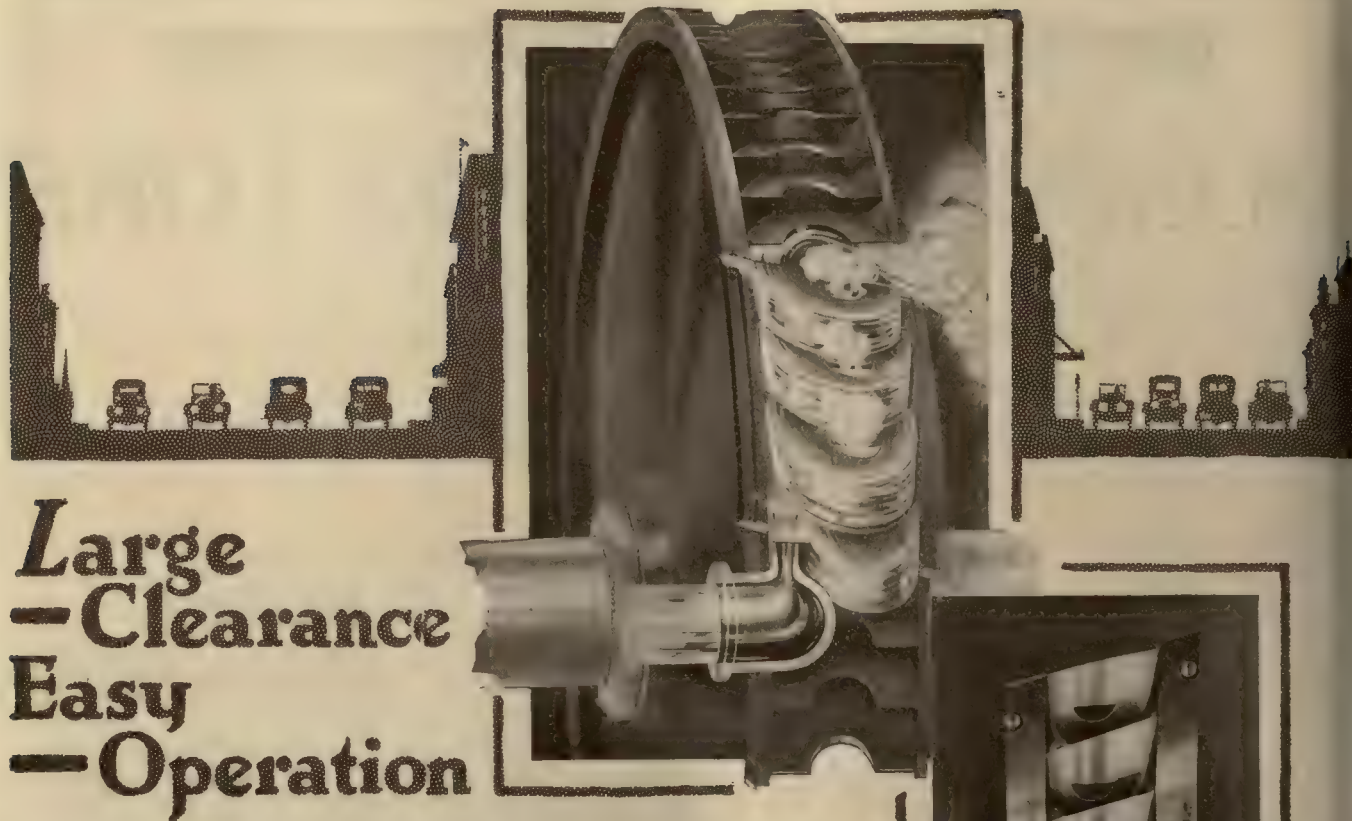
Send for Catalogs

DOSSERT & COMPANY

H. B. LOGAN, Pres.

242 West 41st St., New York





The Terry principle of operation possesses many features of superiority apart from high efficiency at slow speeds. These features are of particular importance to the operating engineer in charge.

Fine blade clearance is not essential to high operating efficiency, the actual clearance between the moving and stationary blades being greater than $\frac{3}{8}$ inch. Owing to the position of the blades, end play cannot affect this clearance and the side clearance is 1 inch or more. It is therefore not essential to make frequent adjustments of the thrust to maintain efficient and safe operation.

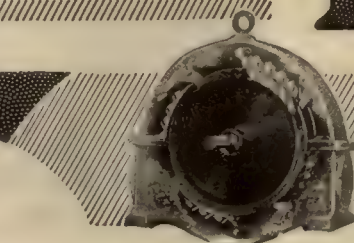
Clearances in the Terry blading may be reduced only by excessive wear on the main bearings, but even if this should occur, the projecting rims on the sides of the wheel would rub on the smooth protecting surfaces of the reversing chamber, thereby automatically stopping the turbine, before damage could result. Replacement of the interchangeable bearings immediately restores the original clearance.



For a turbine which frees the operator from worry—specify

THE TERRY TURBINE

Offices in Principal Cities
in U.S.A. also in Important
Industrial Foreign Countries



The Terry Steam Turbine Co.
Terry Sq. Hartford, Conn. U.S.A.



CONSOLIDATED

Electric Car Heaters

*Thermostatic
Control*

*Pneumatic Door
Engines*

*High Voltage
Buzzers and Bells*

*Motorman's
Signal Lights*

Consolidated Car-Heating Company
Albany, New York



Used on City Systems from Coast to Coast—

kept in service with least maintenance cost

INTERNATIONAL Fare Registers are standard equipment for a large majority of the street railway systems of this country, as well as being used extensively in other parts of the world.

The largest street railway in the world (Chicago) is completely equipped with Internationals—and the first registers, sold them twenty years ago, are still in use.

Another large system (Philadelphia) bought their first International Registers in 1901 and 1902. The system was completely equipped in 1908 and 1909 when they purchased 2,200 registers. Last year over 2,600 additional International Registers were installed when a ticket fare required double registration equipment. The total now

exceeds 5,500 International Registers on this system.

The city system in Rio Janiero, Brazil, has in use over 900 single and nearly 400 double International Registers.

Repeat orders until the system is completely equipped are a customary action after a trial installation of collection methods based upon International Register equipment.

Many experiences like those of the Chicago and Philadelphia, where many of the first registers, now twenty years old, are still in service, indicates the correct design and honest manufacture of Internationals. Some of these old registers come back to us from time to time for re-letting of dials,

or for replacement of minor parts. Their years of service have developed no inherent weakness, nor has experience suggested any but the most trifling changes in detail design. In only a few cases do the changes so made affect the interchange of parts between the first machines built and those now standard.

Long years of satisfactory performance with minimum expense for maintenance attention have established International Registers as standard street railway equipment.

We invite correspondence regarding the solution of fare collection problems for individual requirements.

*Manufacturers of fare registers and railway supplies,
and General Selling Agents for*

HEEREN ENAMEL BADGES

The International Register Company

15 South Throop Street, Chicago

THE NAME
HALE & KILBURN

*Stands for Highest Standard in
Electric Car Seating*



All Steel
Seat—
Rattan Spring
Cushion



Light
Weight
Steel
Seats
Springless
Cushion

Best Seats
both
Stationary and Reversible
for

**One Man
Safety Cars**

Seats of various types
suitable for
Every Class Safety Car
and for
Motor Buses

Write for Particulars

Best Seats for

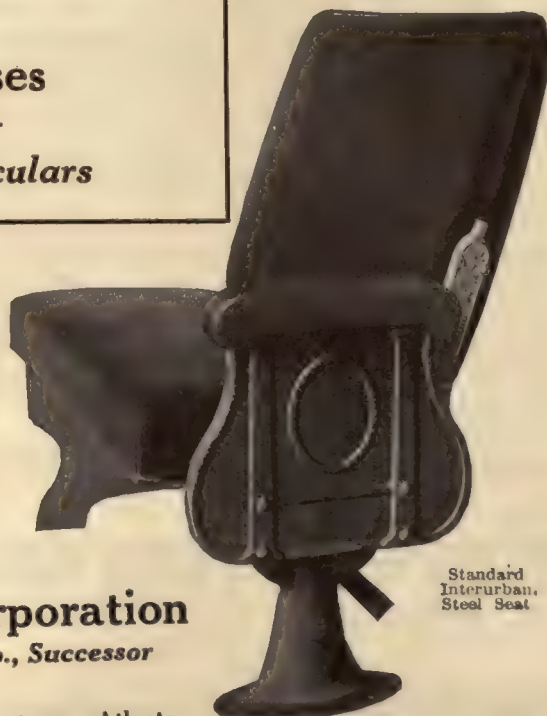
City Cars
Interurban
Lines
One Man Cars
Trolley Buses

**H & K Seats
are**

Neatest
Lightest
Strongest
Simplest



Lightest and Best
Wood Slat Seat



Standard
Interurban
Steel Seat

Hale & Kilburn Corporation

American Motor Body Co., Successor
Philadelphia

New York — Chicago — Washington — Atlanta



—here it is

Perey Car Turnstile

You are talking and thinking about car turnstiles. Here is a Perey Car Turnstile installed on the platform of a one-man-car. If it can be installed in the limited space on the platform of a safety car it can be installed on any type of car.

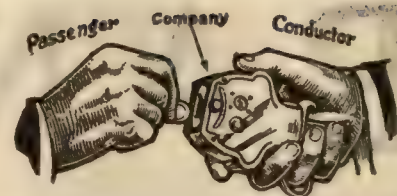
- it is light
- it is practical
- it is durable
- it is reliable
- it gets all the fares

We have made turnstiles for thirty years

Perey Manufacturing Co., Inc.

30 Church Street, New York City

—have you ever really considered fully all the possibilities of the



The familiar *Rooke Portable* as used in going after fares.

ROOKE

Automatic Register

and the

New Box-Portable Type?

Adaptable to Any Fare Collection Conditions

Any conditions—any rate of fare—all look alike to the road using Rooke Registers. Just to mention a few of the many variations which are adequately handled, note these:

- Flat fares or zones
- Cash fares or tokens
- Pay enter or pay leave
- Collecting through the car
- Open or closed cars
- Motor Buses
- One man cars
- Front end street collectors

Do you know any other fare box or hand collection method which adequately protects the railway company under all of these phases of fare collection?

The Rooke Register—really an automatically registering portable fare box—performs all the functions of any other fare box, and moreover produces an audible bell signal registration. The very act of the passenger in paying fare physically accomplishes this registration. *It is not left to the option of the conductor—he cannot evade it.*

Our liberal leasing plan obviates the necessity for investing money in fare box equipment which may turn out to be unsuited to conditions—or which a change in fares may render useless. Our contract also provides for adequate maintenance of Rooke Registers.

The One-Man Problem Solved

The Rooke Automatic Register is absolutely adapted to fare collection on the one-man type of car. But to make its manipulation even more easy, we developed the Rooke Box Portable—a light-weight foot-operated holder for the standard Rooke Register. It leaves the car operator free to use his hands for controlling the car. The passenger inserts his fare which automatically registers itself and passes through onto a visible inspection plate, under the operator's eye. Pressure on the foot pedal resets the Register for the next fare and clears the inspection plate for the next coin. The Rooke Register may be removed at any time and taken through the car for a hand collection in the usual manner. These boxes are *now in use*.

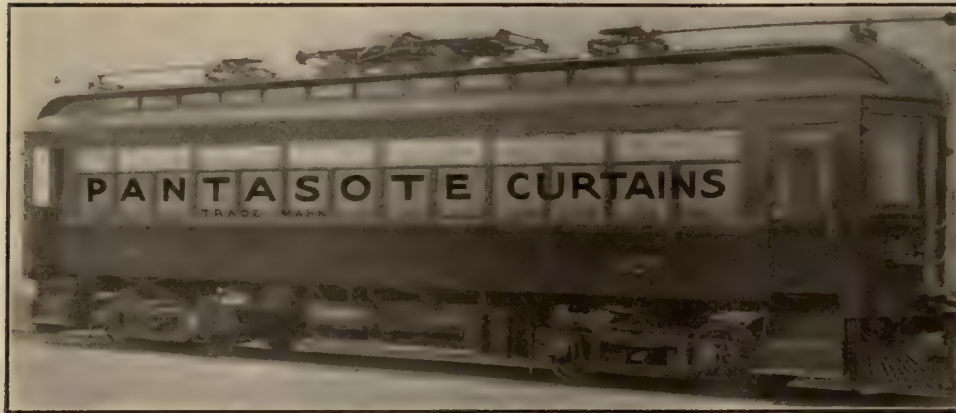
Write for full particulars.

Rooke Automatic Register Company
Providence, R. I.



PANTASOTE

(Trade-Mark)



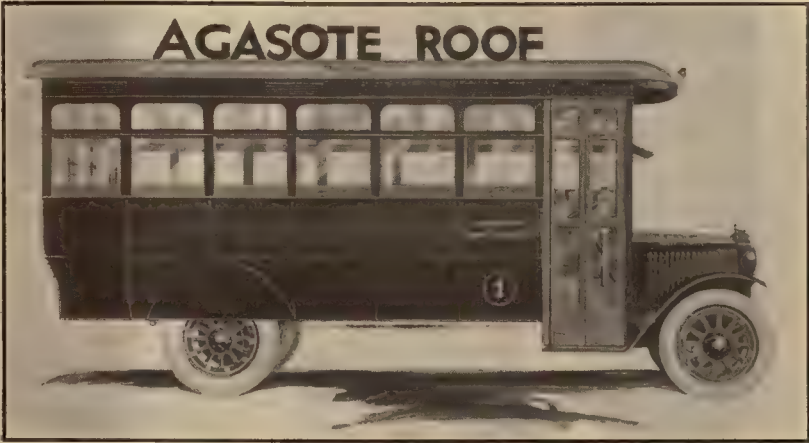
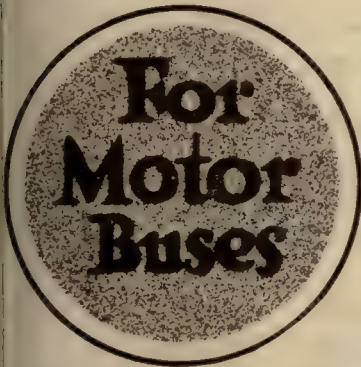
THE PANTASOTE

11 Broadway

Peoples Gas Bldg., Chicago

AGASOTE

(Trade-Mark)



COMPANY
New York

751 Monadnock Bldg., San Francisco, Cal.

—It'



BOYERIZED

Brake Hangers	Center Bearings
Brake Levers	Side Bearings
Pedestal Gibs	Spring Posts
Brake Fulcrums	Bushings
Bolster and Transom Chafing Plates	
Stag Brand Manganese Brake Heads	
Bronze Bearings—Motor and Truck	

Bemis Car Truck
Springfield

Time to Decide on Higher Standards

Spend More Money—Not Less—If You Want to Cut Costs!

SOUNDS unreasonable at first, but the saving comes in spending it less often. It's the same way with your own suit of clothes. You can get a snappy-looking ready-made suit in any downtown store for half what your tailor charges you—but where will it be at this time next year?

When you buy Boyerized Brake Pins and Fittings you've got to pay a little more for the special hardening treatment these products receive. They have the "stuff" in them that will make them outlive ordinary steel three to four times.

Put some on your cars and compare the cost per car mile with the other kind. You can easily satisfy yourself where the higher standards of maintenance and the real economies are.



Company
Mass.



H-B LIFE GUARDS

On Every Car in Manhattan's Crowded Streets

The cars of the New York Railways Company and those of the Third Avenue Railway Company, shown above at the 42nd St. Ferry Terminal, are only two examples of the many different companies in New York proper as well as Brooklyn, which depend on H-B Life Guards to protect them from fatal accidents. Here the streets of the business section are jammed with pedestrians and "Jay Walkers," while the car tracks are the playground of the children in the tenement districts. Such a wide-spread congestion of population and street traffic is found nowhere else in this country.

The experience of the numerous operating companies here has demonstrated that the H-B Life Guard furnishes the best possible protection for both the public and the railway. And now-a-days as they add new safety cars to their rolling stock, every one is fitted out with H-B Life Guards before going into service.

The Consolidated Car Fender Co., Providence, R. I.

General Sales Agent

Wendell & MacDuffie Co.

61 Broadway, New York

Kalamazoo

Trolley Wheels and Harps



Performance that *Improves Service*

EQUIP your cars with Kalamazoo Wheels and Harps and note the immediate *improvement in service.*

Kalamazoo Harps give perfect and continuous contact and are designed to permit quick and easy replacement of wheels. There is only one cotter pin to be taken out to remove the wheel.

Kalamazoo Wheels are made of virgin metal—pure lake copper. They are perfectly balanced for easy running and freedom from slippage.

Kalamazoo Wheels used with Kalamazoo Harps make the ideal current collector from the standpoint of long life and efficient service.

*Write for illustrated catalog.
It will be mailed free upon request.*

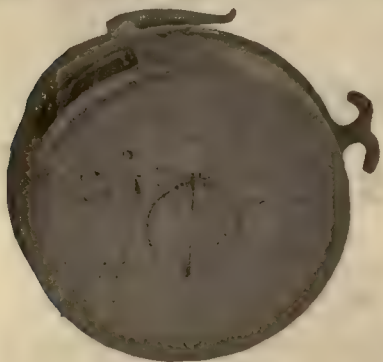
Star Brass Works
Kalamazoo, Mich.



Now you need no longer hesitate as to which Earl Catcher or Retriever to use

For Safety Cars

FOR SAFETY CARS use the Earl No. 10 Catcher, or No. 4-A-S Retriever, specially designed for City Service.



Their rugged, practical construction makes maintenance costs a negligible factor

For City Cars

FOR ORDINARY CITY OR SUBURBAN CARS use the Earl No. 7 or No. 10 Catcher, or the No. 4-A-S Retriever.




They save many a tie-up when the trolley jumps the wires—and the initial investment is small

For Interurban Cars

FOR HIGH SPEED INTERURBAN CARS use Earl No. 4-A-L or No. 5-A-L Retrievers.

C. D. Earl, York, Pa.

Foreign Agents everywhere except Canada
 THE INTERNATIONAL GENERAL ELECTRIC CO.
 Made and sold in Canada by
 RAILWAY & POWER ENGINEERING CORP., LTD., TORONTO



Distinguished by the Spots

SAMSON SPOT

Is Your Trolley Cord Giving 100% Service?

If the trolley cord you are using isn't satisfactory in every respect—if it gets rough, doesn't wear well, is affected by dampness—you should know that a cord of unusual merit—

SAMSON SPOT TROLLEY CORD

is giving honest service on hundreds of systems. It is distinguished by the Colored Spots—our trade mark. Waterproofed to withstand weather action; non-swelling and smooth. Made of extra quality cotton yarn, firmly braided, and smoothly finished.

Samson Bell and Register Cords

are made in all sizes and colors with wire center, if desired. They are unsurpassed for service.

Every executive should investigate these cords. Drop us a line and we will send samples and prices.

Samson Cordage Works
Boston, Mass.

Ordinary Brake Shoes 15,187 miles

Weierbach Brake Shoes 25,308 miles

Comparative Tests Invited

WEIERBACH Brake Shoes give greater mileage

Made to M. C. B.
and A. E. R. A.
Standards



THE graph above shows the average results of actual service tests on Weierbach Brake Shoes compared with another well-known make. Under varying types of cars, Weierbach Brake Shoes gave from 11,947 to 37,126 miles each, the average being 25,308 miles, or more than sixty per cent greater than the average mileage of the other type under identical conditions.

Moreover, Weierbach Brake Shoes make smoother and more quiet stops, eliminating chattering and jerking.

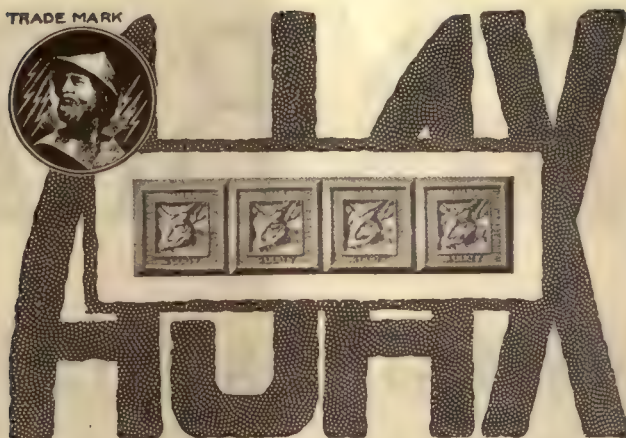
Make a trial test under your own cars and your own conditions to satisfy yourself that Weierbach Brake Shoes are most economical.

Order today.

Weierbach Brake Shoe Company
Scranton, Pa.

Western Sales Agent

Al. H. Hoffman, 315 American Bank Bldg., Los Angeles, Calif.



Bearing Metals and Castings

Mileage Increased—Costs Reduced

In over forty years' experience, our production of bearings and bearing metals has grown from a small beginning to a present rate of thousands of tons per year.

In the hard struggle of the electric railways to exist, no product could survive unless its quality resulted in maximum economy. That's why Ajax Bearings are so generally used. And our immense quantity production means standardized methods and lowest prices consistent with superior quality. Consequently, you can surely count on *lower costs per car mile* for cars running on Ajax Bearings.



Ajax Check Plates



Ajax Car Brasses

The Products Are

AJAX CAR BRASSES—leaders in their field for more than forty years. They are cast of finest quality metals, and turned with the accuracy and precision of a car wheel.

AJAX CHECK PLATES—made of our Perfecto Bronze, which will bend before it will break. They outlast other check plates and give entire satisfaction.

AJAX BULL BEARING ALLOY—the most dependable and economical lining for brasses and axle bearings—it lasts longer, runs cooler and costs less.

Specify Ajax products for new equipment and repairs

THE AJAX METAL COMPANY

Established 1880

Philadelphia, Pa.

ULCO BRAND

Bearings that *Run Smoother—Last Longer— Cost Less*

Ulco Brand-Frary Metal is displacing brass and bronze as a bearing metal, because *its actual ultimate cost per car mile run is less.*

Babbitt Lined Brass Bearings depend on the tin bond between the babbitt lining and the brass. When that is gone the lining is gone, and as tin has a low melting point it takes but little over-heating to break down the bond. Ulco Brand-Frary Metal bearings are cast solidly, therefore the question of bond is eliminated.

Ulco Brand-Frary Metal has high tensile and compressive strength, a higher melting point than the tin base metals, and yet is more plastic. Thus it gives minimum frictional resistance and cannot score the axle. It is also far less subject to cracking than bearings of the ordinary type. Note the service record of Ulco Brand-Frary Metal on a car of the Indianapolis & Cincinnati Traction Co., as shown on the opposite page. We have equipped many roads. Let us take the matter up with you now.

What FRARY METAL Is!

Ulco Brand-Frary Metal is the successful result of years of scientific endeavor to give to lead sufficient hardness to make a suitable mechanical bearing. Smoothness and the anti-frictional qualities of lead have long been recognized as desirable qualities for bearings, but heretofore no one has been able to treat it so as to obtain the other necessary bearing qualities of durability, hardness and compressive strength.

Although lead alone emits a dull sound when struck, the physical structure of Frary Metal is such that it gives a clear ringing sound, and to the touch it is extremely smooth.

The United Lead Company has developed and now controls the process of making Ulco Brand-Frary Metal, a process which is different from any other method of hardening lead, thereby giving to the metal a lasting hardness with the crystalline structure necessary to a perfect bearing metal.

The Bureau of Standards at Washington, D. C., has made a report of physical and service tests of this metal, showing it to give better results than genuine babbitt. This metal is therefore suitable for all classes of bearings, such as motor axle, armature, journal bearings, etc.

Our twenty-page booklet gives a fund of information on the characteristics of this metal and the results of various tests. We will gladly send you a copy together with other information if you will write us—a coupon is provided for your convenience. Just fill it in and send it today.

UNITED LEAD COMPANY

111 Broadway, New York, N. Y.

FRARY METAL



Equipped with Frary Metal Bearings.
Indianapolis & Cincinnati Traction Co.



**ULCO BRAND
FRARY METAL**

RECORD
ULCO BRAND—FRARY METAL

5" x 9" Standard
M C B Bearing

Name of Railroad Indianapolis & Cin. Traction Co.
Number of Car # 301
Total wgt. of Car 102,000
Maximum Speed 80 mi p h.
Date bearing installed Feb. 24, 1921
Date examined Jan. 19, 1922
Mileage to date 77,635 miles
Wear 7 oz

This is one of many good records.

The FULL DATA Coupon

UNITED LEAD COMPANY,
111 Broadway, New York, N. Y.

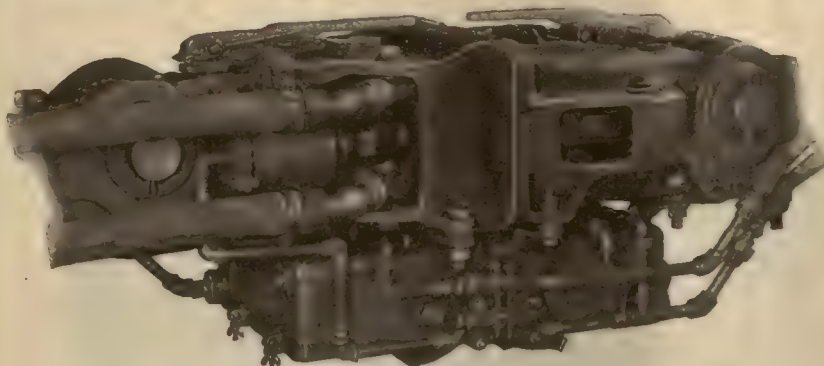
Please send me without obligation your booklet on
Frary Metal, and copies of records.

Name and Title.....

Company.....

City and State.....

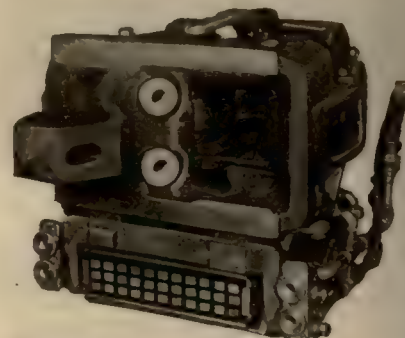
VAN DORN CAR-AIR-ELECTRIC COUPLERS



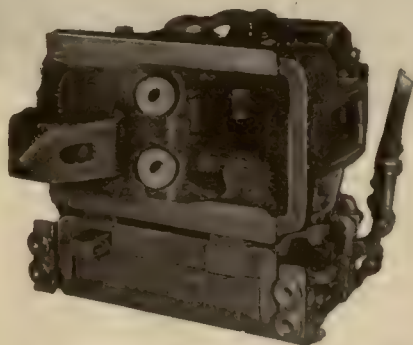
Van Dorn No. 1050 Car-Air-Electric Couplers in coupled position.

Van Dorn Car-Air-Electric Couplers effect automatically, in sequence, an unyielding coupling of cars, air lines and electric circuits. Maintenance cost is reduced to the minimum by simplicity of construction and the rigid-locking principle which practically eliminates wear on coupling surfaces and locking parts.

To the right is shown Van Dorn 18-Conductor Electric Coupler attached to underside of Car-and-Air Coupler, with door open as in coupled position. It is impossible to couple cars without the doors of the Electric Couplers opening automatically and the contacts wiped. The pressure exerted between the electric members when coupled assures a weather-proof joint about the contacts.



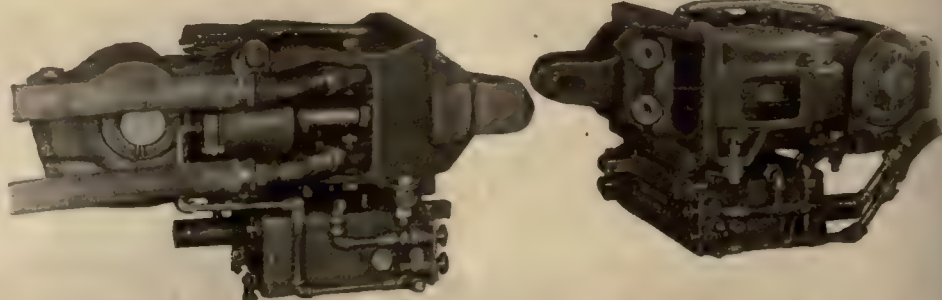
Showing "coupled" position of electric member.



Uncoupled or train end position.

The contacts move out of the way and the cover closes automatically when cars are uncoupled. The Electric Coupler is absolutely protected against the elements when in uncoupled position, and being entirely encased on the bottom, eliminates dust, rain or snow from being swept in at the dead end of train.

The positive alignment of the car couplers protects the electric members in coupling, and the tight lock maintains leak-proof air connections and proper registration of the electric contacts at all times.



Practical time and labor savers.

VAN DORN COUPLER COMPANY
2325 South Paulina Street, Chicago, Ill.



The low ultimate cost of Bates Poles becomes more and more apparent with each year of service.

Maintenance—

Poles of low first cost and low upkeep certainly guarantee low maintenance.

First cost on Bates steel poles is the lowest possible. You can buy a Bates pole for very little more per pound than you pay for structural steel at the warehouse. We are able to do this because we make one every two minutes of the simplest possible construction and at the same time lowest possible weight and greatest possible strength.

Upkeep is low because Bates poles are of one piece of steel, no joints or interior surface to rust. Very easily and *completely* painted and inspected.

Maintenance is naturally low because the cost of upkeep is not out of line and because a Bates steel pole, after replacing a wood pole at practically the same cost or replacing other types of poles at less cost, does not have to be replaced for a period greater than applies to any other type of pole.

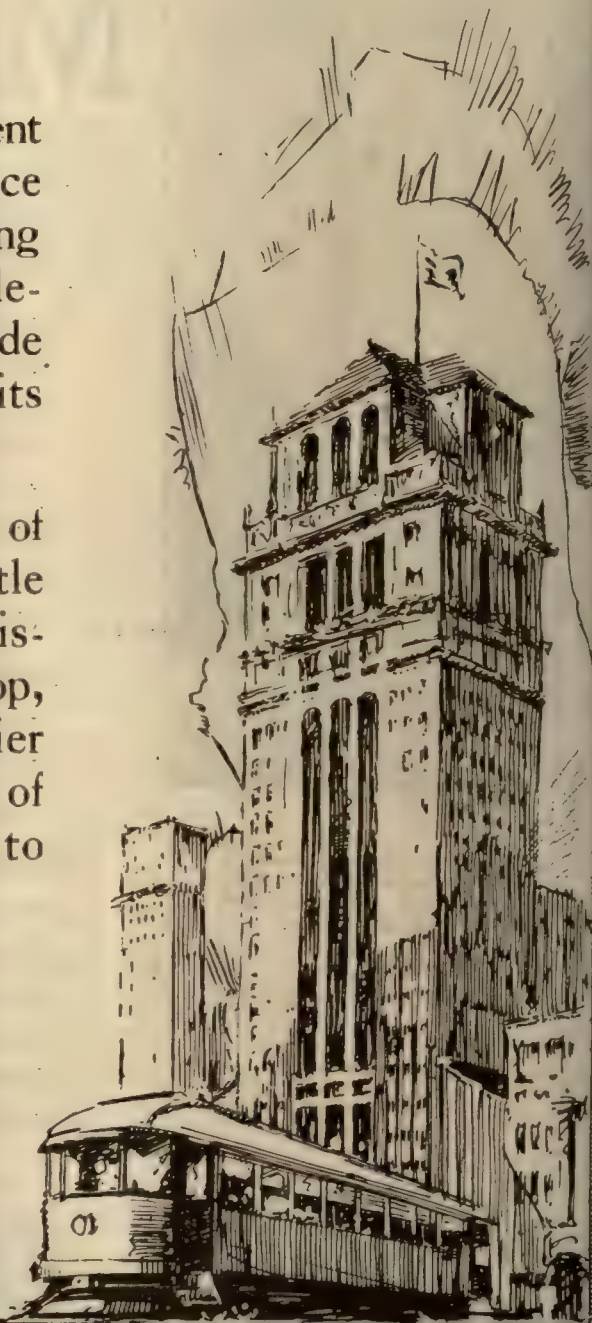
Bates **E**xpanded **S**teel **T**russ **C**o.

208 So. La Salle St., Chicago, U. S. A.

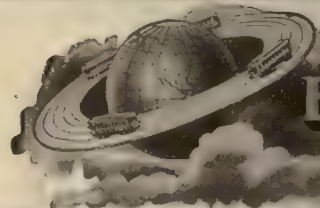
BATES ONE PIECE **EXPANDED** **STEEL POLES**

GREAT as is its present prestige, the full force of car card advertising would have remained undeveloped lacking a nationwide organization to realize its possibilities.

The few crude car cards of many years ago gave little promise that such advertising would eventually develop, under the guidance of Collier Service, into a medium of publicity of such benefit to the Railway Companies.



CANDLER BUILDING, THE HOME OF COLLIER SERVICE



Barron G. Collier

INCORPORATED

CANDLER BLDG NEW YORK

Increase Your Transportation Sales

By Increasing the Efficiency of Your Service



"U"

"V"



*Keep Your Cars Always on Time by Using
Bayonet Trolley Equipment*

Bayonet Special Trolley Wheels

are made of the very highest grade of metal. No cheap alloys or old trolley wheels recast into new ones. All hand turned, insuring the greatest accuracy and balance. They are known all over the world for their superiority over other wheels, their economical and efficient service having been proved by competitive tests.

Bayonet Detachable Trolley Harps

are the only trolley harps with which you can change from wheel to sleet cutter or to a new wheel in TEN SECONDS. No tools required on top of the car; only your hand is necessary. All inspections, repairs, adjustments and lubricating are done at the work bench where they are better done. This eliminates unsatisfactory patchwork on top of car, insures perfect running trolleys and increases your trolley wheel mileage at least 33 $\frac{1}{3}$ %. The original and only practical Non-Arcing Harp made.

Bayonet Trolley Base with Detachable Pole Clamp

is the only trolley base made on which the trolley pole can be changed in 30 SECONDS and the wheel be in perfect alignment with the wire, and no tools required to do the job. Greatest flexibility of pole action is afforded by long extension springs and self-lubricated bushings in bearings, and the roller bearing swivel gives freedom to the rotary motion. It is so constructed that you get a uniform wire pressure at all angles of pole. All wearing parts are quickly and cheaply renewed, making the main parts of the base everlasting.

Perfect conductivity is afforded by sliding contact between turret and base plate. It saves your overhead, your wheels and your wire by its freedom of action.

Bayonet Sleet Cutters

have no superiors in cutting ice from the wire. If the ice can be removed the Bayonet will do the job. We have the rigid and semi-rotary types (the kind you can back up with) both of which are detachable and interchangeable with the wheel. Only ten seconds necessary to make the change from harp with wheel to one with sleet cutter.

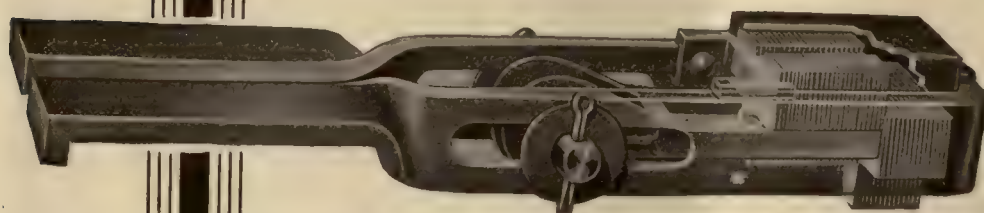
All Bayonet equipment sold subject to approval. You must be satisfied or your money will be refunded. Begin now to practice economy by using the Bayonet.

BAYONET TROLLEY HARP CO.
Springfield, Ohio, U. S. A.

There's No Slack Business Here



Don't Have To Tighten Up When You Use



S-W Brake Slack Adjusters

Constant correction of slack is one of the surest preventions of accidents. S-W Brake Slack Adjusters automatically take up this slack as it occurs without any human attention whatever. As long as there's a brake shoe on every wheel the motorman finds the brakes doing exactly what he wants.

Wear on the shoe is more evenly distributed, which means lower replacement cost and fewer inspections. Also less air is used to set the brakes.

S-W Brake Slack Adjusters are a big step toward maximum revenue cars because increased schedule speeds are obtained by making safer the use of high rates of braking with smooth stops.

SMITH-WARD BRAKE COMPANY

233 37th Street, BROOKLYN, N. Y.

*He was once a good customer
but now
he buys practically nothing.*

December 30, 1921.

415-300-5

Mr. C.E. Sawtelle, President,
Tool Steel Gear & Pinion Company,
Cincinnati, Ohio.

Dear Sir:-

As a matter of mutual interest I take pleasure in informing you that we have removed four steel gears for the reason that the axles were worn out while in service. The service of these gears covered a period of nine years and made a total mileage of 705,800 miles. The surprise of the whole matter is that the gears are considered sufficiently good to remount on new axles and we anticipate that there is from 200,000 to 300,000 more miles wear in these gears.

It is rather gratifying to have such records made on electric motor gears and is proof that our judgment was right when we decided some seven years ago to use nothing but Tool Steel Gears and Pinions.

Yours very truly

*The greatest fault with "Tool Steel"
gears is that they won't wear out.
You must specify us on new
equipment or we will starve!*

The Tool Steel Gear & Pinion Company
Cincinnati, Ohio



V-K

OIL-LESS TROLLEY WHEEL

and Non-Arcing

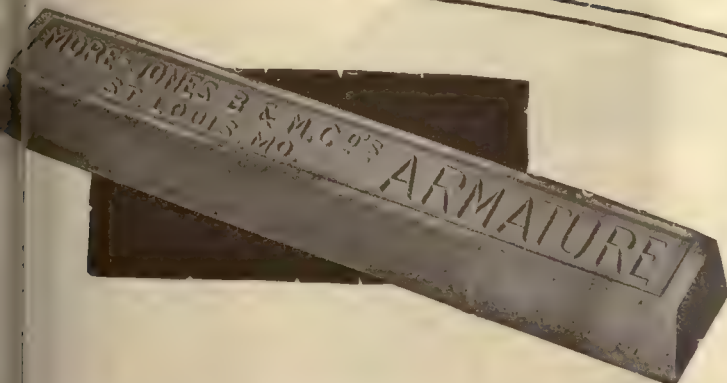
Perfect lubrication plus maximum conductivity is the combination that makes V-K Trolley Wheels lowest in ultimate cost and highest in net efficiency.

Examine the construction and you will see that V-K wheels and harps are properly balanced and mechanically perfect in finish.

Wheel metal is tough yet not too hard. The patented oil-less graphite and bronze gauze bushings are non-insulating, heat proof, long lived and easily interchangeable.

Use V K wheels and harps for greater mileage and less detriment to overhead construction. Let us send you a copy of our booklet, "Trolley Wheels."

MOR



M-J Armature Babbitt

Ordinary babbitt is not equal to the requirements of the electric railway armature bearing field. Temperature, Strain, Vibration and Pounding all render it unfit for use.

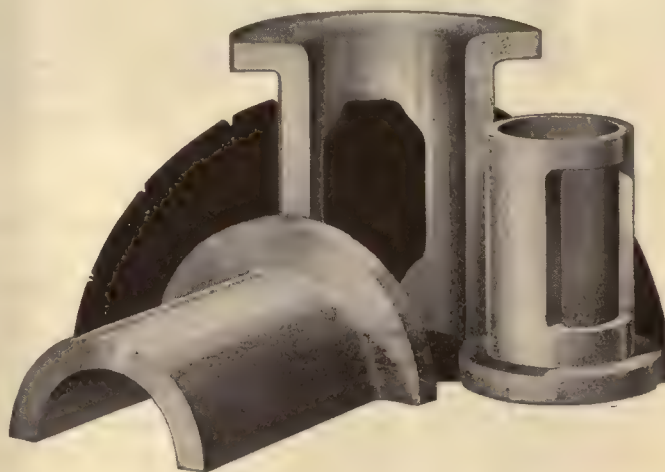
That's why More-Jones, with some forty years of experience to guide them compounded an exceptional babbitt of tin, copper, antimony and metallic nickel, a specialized product for Armatures.

M-J Armature Babbitt is sold on a basis of service not cost. The "Babbitt Booklet" will be sent on request.

Tiger Bronze Axle and Armature Bearings

The money you will save in bearing replacements and in rewinding armature coils will pay for Tiger Bronze bearings many times over in a year and that does not include the loss you take every time a car is thrown out of service.

Exceptional toughness and anti-frictional qualities in Tiger Bronze bearings insures great strength and a slow and even rate of wear. This means only one thing—correct bearing alignment and greater mileage.



Illustrated Booklet sent on request

JONES BRASS & METAL CO.

ST. LOUIS, MISSOURI



—meets every

MILLER TROLLEY SHOE (PATENTED)

How Miller Trolley Shoes Do It

Replacing trolley wheels, Miller Trolley Shoes reduce trolley troubles and afford economies because they—

1. Have 3 in. contact with wire.
2. Collect more current with less resistance.
3. Require less tension against wire.
4. Need no oiling.
5. Last longer than wheels.
6. Make no noise.
7. Do not jump and tear down wires.
8. Eliminate arcing and burning of wire.

Do What these Roads

MILLER TROLLEY

Boston 2

Requirement for increased efficiency!



These Roads Are Making Maintenance Economies with **MILLER TROLLEY SHOES**

This is a time-tried and proven device. Many roads have been using them for years. New ones are testing them out and joining the list every year.

Each new user finds what the others have found—that Miller Trolley Shoes require less than half the maintenance that must be given to wheels—and that the wear and tear on trolley wire is actually less with Miller Trolley Shoes.

Some of the Miller Shoe Users

Pensacola Electric Company (Fla.)
Chicago, Aurora & DeKalb R.R. (Ill.)
Chicago, North Shore Milwaukee R.R. (Ill.)
East St. Louis Suburban Ry. (Ill.)
Illinois Traction System (Ill.)
Indianapolis & Louisville Traction (Ind.)
Interstate Public Service Co. (Ind.)
Lebanon Thorntown Traction Co. (Ind.)
Waterloo, Cedar Falls & No. Ry. (Iowa)
Keokuk Electric Co. (Iowa)
Orleans Kenner Trac. Co. (La.)
Androscoggin Electric Co. (Me.)
Portland-Lewiston Int. Ry. (Me.)
New York, New Haven & Hartford R.R.
Nantasket Beach Br. (Mass.)
Providence-Fall River Br. (R. I.)

Michigan Railroad Co. (Mich.)
St. Paul Southern Elec. Ry. (Minn.)
Hudson Valley Ry. Co. (N. Y.)
International Ry. Co. (N. Y.)
Elmira, Corning & Waverly Ry. (N. Y.)
Columbus, Marion & Bucyrus Ry. (O.)
Dayton & Troy Elec. Ry. (O.)
Hocking Sunday Creek Traction Co. (O.)
Oakwood Street Ry. (O.)
Lehigh Valley Transit Co. (Pa.)
Ephrata Lebanon Trac. Co. (Pa.)
Cleveland & Erie Ry. (Pa.)
Johnstown & Somerset Ry. (Pa.)
Southern Cambria Ry. (Pa.)
York Railways (Pa.)
Northwestern Penn. Ry. (Pa.)

Warren & Jamestown St. Ry. (Pa.)
Chambersburg, Greencastle & Wayne (Pa.)
Schuylkill Railway (Pa.)
Newport County Elec. Co. (R. I.)
Knoxville Ry. & Lt. Co. (Tenn.)
Houston Elec. Co. (Tex.)
Northern Texas Trac. Co. (Tex.)
Eastern Texas Elec. Co. (Tex.)
Charlottesville & Albermarle Ry. (Va.)
Puget Sound Pwr. & Lt. Co. (Wash.)
Monongahela Valley Trac. Co. (W. Va.)
Milwaukee Elec. Ry. Lt. Co. (Wisc.)
City of Toronto (Can.)
Havana Central R.R. (Cuba)
Hanshin Elec. Ry. (Japan)
Kobe Municipal Ry. (Japan)

Did—Try Them!

SHOE COMPANY

Massachusetts



In Chicago and Outside!

On the long, fast elevated passenger trains, and the heavy electric switching locomotives of the Northwestern Elevated Railroad of Chicago, they use reliable, long-wearing "Standard" Rolled Steel Wheels. And then too, on that high-speed interurban line,—the Chicago & Milwaukee Electric Railway—now famous for superlative service, speed and safety they also use them.

"STANDARD"

Steel Tires
Steel Tired Wheels
Solid Rolled Steel Wheels
O. H. Steel and Malleable Iron Castings
Solid Forged Gear Blanks
Steel Forgings
Iron Forgings
Forged and Rolled Steel
Pipe Flanges
Ring Dies
Roll Shells
Steel Springs



"The 'Standard' Brand on your material is an assurance of eventual economy."



Standard Steel Works Company
500 North Broad St., Philadelphia, Pa.

CHICAGO
ST. LOUIS
HAVANA, CUBA
ST. PAUL

RICHMOND
SAN FRANCISCO
NEW YORK
HOUSTON

PORTLAND, ORE.
MEXICO, CITY
BOSTON, MASS.
PITTSBURGH, PA.



"Built for Service"



Chillingworth One-Piece Drawn Steel Seamless Gear Cases

Made in a plant devoted exclusively to the manufacture of gear cases.

A highly Specialized Product combining light weight with strength and durability, and eliminating objectionable seams and rivets.

**Once Used
Always Specified**

Chillingworth Mfg. Co.
Jersey City, N. J.

Consider 1922 Requirements NOW!

Prompt deliveries can now be made of all our regular lines of manufacture, including Ramapo Switches, Frogs, Crossings, Ramapo Automatic Return Switch Stands, Ramapo Automatic Safety Switch Stands, etc. Manganese Crossings over Steam and Electric Railways are our specialty. Our engineers will gladly furnish information and plans pertaining to tee rail special work for interurban lines and private right-of-ways.

The features of the Ramapo Automatic Return Switch Stand deserve particular attention. For hand operation it is the same as the Ramapo Automatic Safety Switch Stand; but the automatic action allows the points to be forced open when trailed and return to their original position after each pair of wheels.

These stands are in successful operation on many Interurban lines throughout the country.

RAMAPO IRON WORKS
HILLBURN · NEW YORK

New York Office
50 Church Street
New York

Plants
Hillburn, N. Y.
Niagara Falls, N. Y.



Ramapo Automatic Return Switch Stands are made in three styles for main line and yard installation. Style No. 37 for main line use is illustrated.



Sectional view below cover plate showing mechanism half-thrown automatically.

No Waiting for "Change"

when you use

GLOBE TICKETS



Buy Globe Tickets when you need
School Tickets, Commuters'
Tickets, in fact, any form of ticket.

Let us send you samples

Passengers pass right in and cars get away quickly—and keep getting away quickly all through the run. Globe Tickets encourage car riding by making car runs faster, preventing congestion and delays in boarding and alighting. Sell them in books or strips—it stimulates riding. Tickets adaptable to every condition of traffic—odd fare units, zone systems, etc. Selling Globe Tickets at "reduced rates" is also another form of encouraging riders.

Another thought—Globe P. M. Coupons Transfers prevent transfer abuses, and save conductors' time. Full details on request.

GLOBE TICKET COMPANY

112-114 North 12th Street, Philadelphia, Pa.

NACHOD

**Highway Crossing Bells on the
Union Traction Co. of Indiana**

The motormen on the high speed interurbans of this road do not have to slow down at each crossing. The appearance of the pilot light before they reach the crossing tells them that they are secured against collision by the flashing lights and warning bell of Nachod Crossing Signals displayed at the highway.

*Why not give your motormen and passengers
that feeling of security?*

NACHOD SIGNAL CO., INC.
Louisville, Ky.



*Hollowspun Concrete Poles at Homestead, Pa.,
on lines of Pittsburgh Rys. Co.*

HOLLOWSPUN

Concrete Trolley Poles

are being recognized by progressive railway companies as economical for new work and replacement on account of their permanence, freedom from maintenance expense, attractive appearance and low first cost.

Massey Concrete Products Corporation

Peoples Gas Bldg., Chicago

Sales Offices:

New York

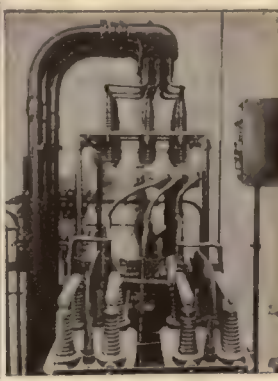
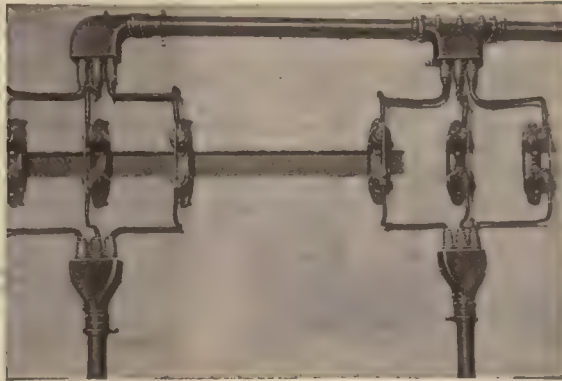
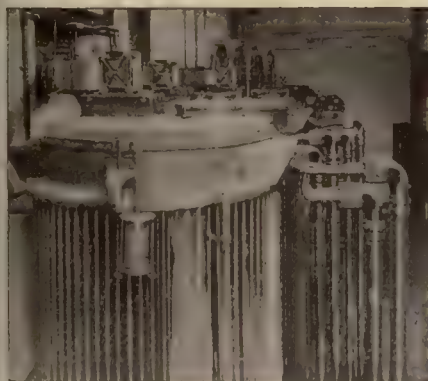
Pittsburgh

Atlanta

St. Louis

Dallas

Los Angeles



Installations of Type D. S. Pipe-Top Terminals in Halcomb Steel Co.'s Plant, Syracuse, N. Y.
Installations designed by E. T. Moore, Elec. Engr.

STANDARD Cable Terminals

Type D. S. (Indoor) Type D. O. A. (Outdoor)

in addition to affording maximum protection to cable insulation both outdoors and indoors, facilitate the convenient and economical installation of such cables. These exclusive and patented features are fully described in Bulletins 710 (indoor type) and 700 (outdoor type). Write our nearest office.

Standard Underground Cable Co.

Boston
New York

Atlanta
Philadelphia

St. Louis
Chicago

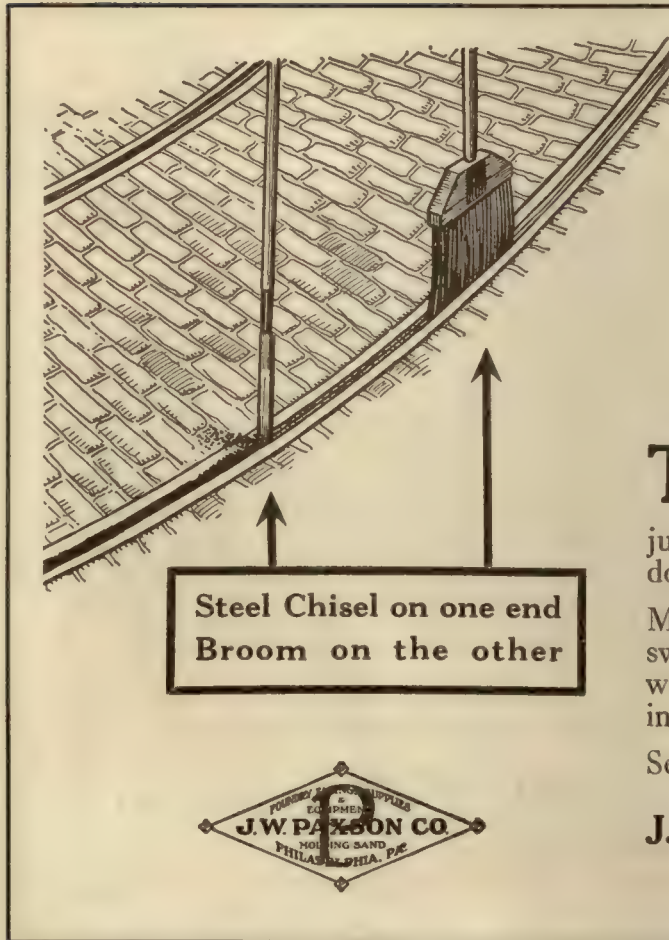
Detroit
Seattle

Los Angeles
Pittsburgh

San Francisco
Washington

Salt Lake City
Kansas City

For Canada: Standard Underground Cable Co. of Canada, Limited, Hamilton, Ont.



For Double Service

—for both SWEEPING and CHISELING service from *each* broom, saving both time and an investment in *extra* tools—get

PAXSON'S TRACK BROOMS

just as experienced railway men have been doing for the past 25 years.

Made of flat steel spring wire. Fits frogs, switches and grooves. Has strong ash handle with steel chisel on other end. Broom is light in weight but strong in construction.

Send for a sample—you will be pleased.

J. W. PAXSON CO., Manufacturers

Nicetown Lane and D Street
Philadelphia, Pa.

Exact Knowledge of Bond Resistance



Bar in place on "T" Rail showing Saw Blade Contact

Roller-Smith Bond Testers will tell you — accurately — just what the bond resistance is, from the "perfect condition" where resistance may equal 2.50 feet of unbroken rail to that point where it may equal 30 feet (or more) of unbroken rail.

The Roller-Smith "One Man" Bond Tester is the instrument to use in testing your bonds. It is small, compact, light, portable, direct reading, accurate, rugged and — above all — dependable.

Let us send you Bulletin No. G-200.

Bulletin G-201 shows a complete Portable Storage Battery Outfit for use where the current in the rail is small, intermittent or entirely absent, and an external source of current is required.

ROLLER-SMITH COMPANY
Electrical Instruments Meters and Circuit Breakers

MAIN OFFICE
2128 Woolworth Bldg.
New York

WORKS
Bethlehem
Pennsylvania

Offices in all Principal Cities in U. S. and Canada



Bar in place on "Girder" Rail showing Saw Blade Contact



BOND TESTERS ARE
STANDARD OF THE WORLD

STOW TRACK GRINDER—Portable

No Traffic Interruptions

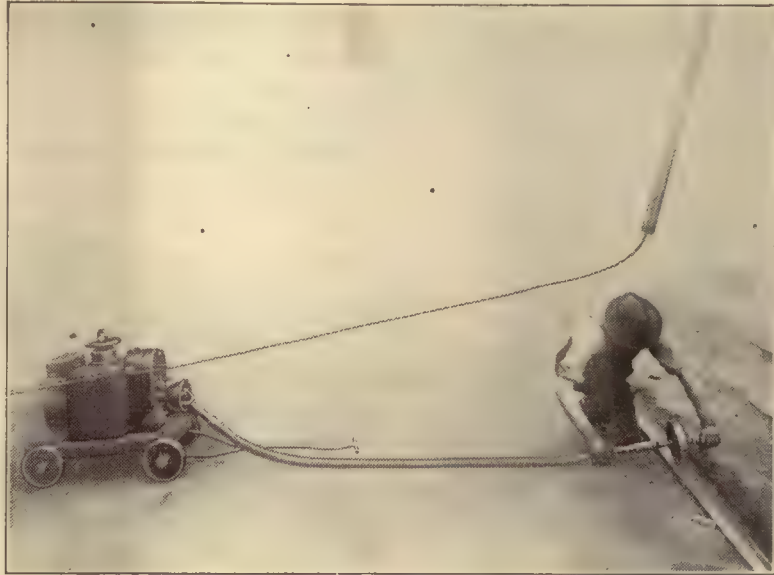
Portable

Cuts Grinding
Cost

Several Sizes

Write for Bulletin
X-15

In General Use



Built only by
STOW MANUFACTURING CO., Inc.
Binghamton, New York, U. S. A.



*Expense and Inconvenience of
track maintenance are
materially reduced
by use of*

CARNEGIE Steel Cross Ties

May we demonstrate the truth of this statement by a visit from our representative or through the medium of our literature?

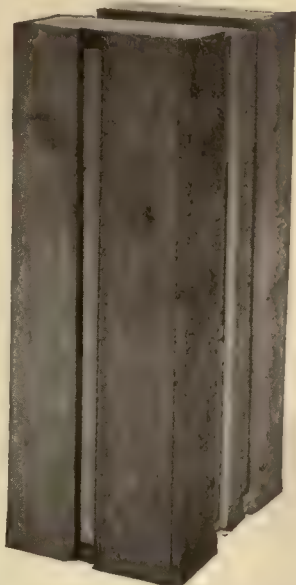
Booklet: "Steel Cross Ties for Every Purpose."

Carnegie Steel Company

General Offices: Carnegie Building, Pittsburgh, Pa.

White's Porcelain Strain Insulators

Standard Package



We are now packing our insulators in cartons

No mussy sawdust
No breaking
Easily counted
Easier handled and stocked

Try some of our insulators. They all have a very uniform brown glaze, a very distinctive color, no black spots or discoloration.

Standard Carton



T. C. White Electrical Supply Company
1122 Pine Street, St. Louis, Mo.



Means Lower Costs
on the Maintenance of
Dynamamos and Motors

—it is a Superior Webbing!

Anchor Webbing Company
300 Brook St., Pawtucket, Rhode Island

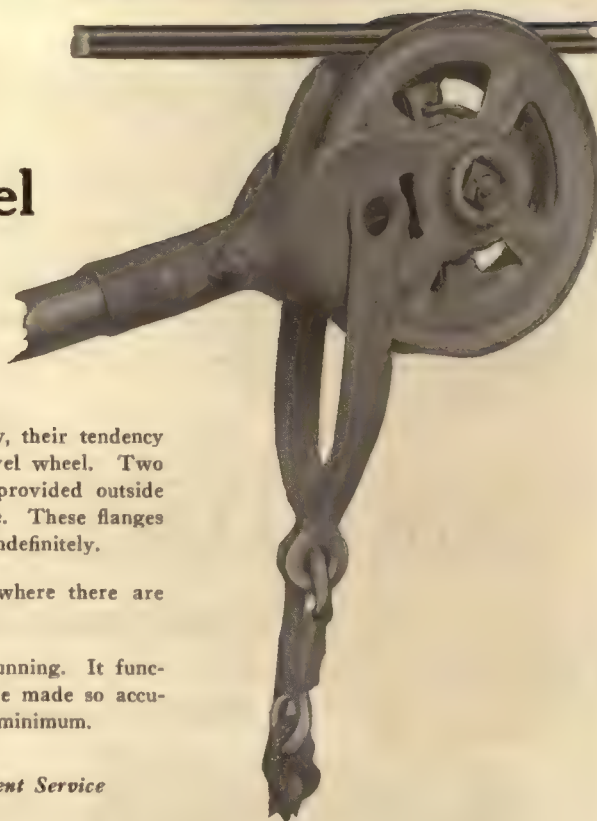
—does the wheel go round?

As the car goes whizzing by, you look up at the trolley wheel in astonishment—apparently it is not turning! *It is the H. H. Wheel!*

The H. H. Trolley Wheel

It Turns—

but the housing does not



To obviate the one big trouble experienced with trolley wheels, namely, their tendency to jump or roll themselves from the wire, we have designed this novel wheel. Two stationary side flanges or guides, stamped from cold rolled steel are provided outside the wheel. The metal is especially treated to prevent wearing the wire. These flanges are made subject to eight different wearing positions so they will last indefinitely.

The guides prevent the wheel from leaving the wire at curves or where there are irregularities in the line.

The wheel itself is most accurately drilled and balanced, for smooth running. It functions free from noise and vibration. All parts of harp and flanges are made so accurately that they are readily interchangeable and cut repair bills to the minimum.

H. H. Trolley Wheels and Harps for Economy, Stability and Silent Service

THE H. H. TROLLEY SUPPLY CO.

Payne Ave. & East 33rd St., Cleveland, Ohio



The Superiority of the **CLEVELAND**

is NOT based solely on its ability to increase earnings—it does that from the mere fact that it is a Fare Box. It is not individual in its method of collecting fares—but it IS individual in its method of handling them, of safeguarding them and doing this efficiently. Given the details of construction and operation—you realize at a glance its safety, economy, flexibility and adaptability to any rate of fare, kind of ticket, and fare collection condition.

The Cleveland Fare Box Co.

CLEVELAND

OHIO

CANADIAN CLEVELAND FARE BOX CO., LTD.

Preston, Ontario



**Griffin Wheel
Company**
McCormick Building
Chicago, Ill.



GRIFFIN F. C. S. WHEELS

For Street and Interurban Railways

All of our plants have adequate facilities for fitting wheels to axles

FOUNDRIES:

Chicago

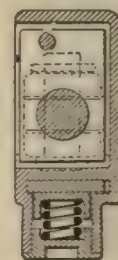
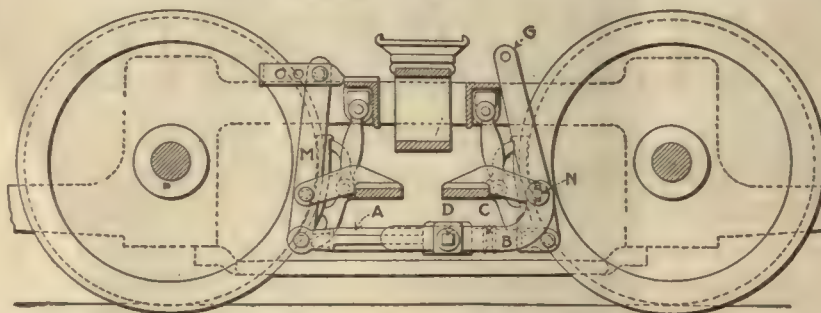
Detroit
Denver

Boston
Kansas City
Council Bluffs

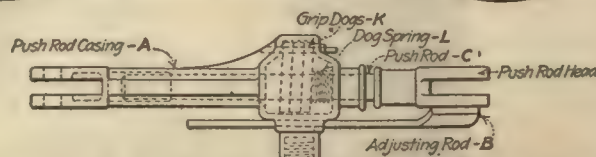
St. Paul
Los Angeles

Tacoma

Brake-Rigging Continuously Taut with—



**GOULD
Slack
Adjuster**



Details of the Gould Type Slack Adjuster as applied to an Electric Car Truck

How often you notice a motorman running with brakes partially set up, due to over-anxiety to be sure that all the slack is out of rigging. The waste of power and wear on brake shoes in such cases is appalling.

Remove the incentive to run with brakes set up, by in-

stalling Gould Automatic Slack Adjusters, which keep the brakes always ready for instant response to the operator's effort. Incidentally you will save materially on shop expense, which occurs from the necessity of frequent manual adjustments of brake rigging when it is not taken care of by Gould automatic adjusters.

Write today for further information

GOULD COUPLER COMPANY

30 East 42nd St., New York City

Works: Depew, N. Y.

The Rookery, Chicago, Ill.

Ever-Tyte Advertisement on the *Back Cover* shows how to save fuel and oil and increase efficiency.

Ever-Tyte—St. Louis

Brake Shoes

A. E. R. A. Standards

Diamond "S" Steel Back is the Best Type



Standard
Patterns

for

SAFETY
CAR



D-67 for Narrow Treads
D-87 for Wide Treads

American Brake Shoe and Foundry Co.
30 Church Street, New York
332 So. Michigan Ave., Chicago Chattanooga, Tenn.



Saved the *other* million dollars!

ALREADY a million dollar damage—one-half the great car barn a seething cauldron, and the fire sweeping onward. Then it came to the Kinnear Doors—and stopped!

KINNEAR

ROLLING DOORS

Ninety street cars and the remainder of the building had been saved. This represented a saving of over a million dollars. After 20 years of vigilance—of being on the job day and night—the Kinnear Rolling Doors of the Devon Avenue barns, installed in 1901 by the Chicago Surface Lines, were called on to show their true worth.

And in this they fully maintained the reputation of Kinnear Doors for over a quarter of a century as real protection against fire and thieving.

Protection of inestimable value—yet Kinnear Doors are so perfectly balanced and so carefully made they actually add to the efficiency of a building.

Let our engineering department tell you (without obligation on your part) how you can benefit by using Kinnear Doors.

February 4, 1922

\$1,000,000 Fire Damage

Ninety Cars Were Lost by the Chicago Surface Lines in Devon Carhouse on Jan. 26

Fire destroyed half of the Devon Avenue carhouse and seventy-eight passenger cars belonging to the Chicago Surface Lines on Jan. 26. Besides twelve miscellaneous service cars were lost. The intervention of steel rolling doors between the street and the carhouse saved many of the cars and the building.

The Kinnear Mfg. Company

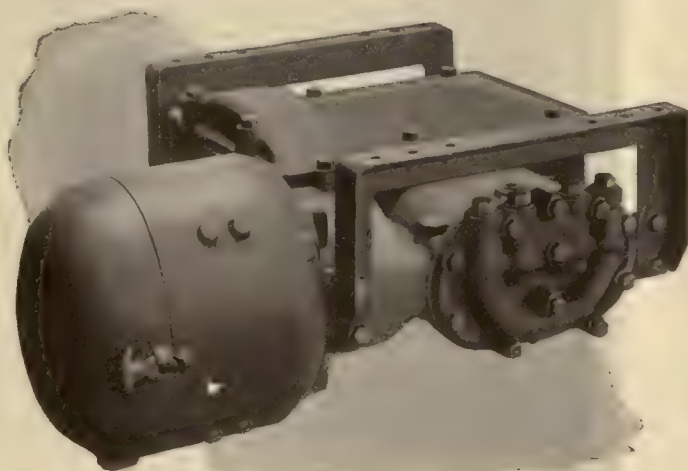
926-36 Field Ave.,
Columbus, Ohio

Kinnear
Doors
after the
fire



ALLIS-CHALMERS

AA-7B Air Compressor



Compressor for Street Car Mounting

A single acting duplex compressor with crank case and cylinders integral. One-piece cylinder-head for both cylinders contains suction and discharge valves. Trunk pistons operated by connecting rods with bushings provided for taking up wear.

Heavily designed crank shaft of high grade steel turns in journal bearings of ample proportions to insure minimum wear.

Herringbone Gears transmit power from motor shaft to crank shaft with practically silent operation.

Lubrication is positive and efficient. Connecting rods dip into the oil and splash reaches all working parts. Gears run in oil.

Send for Bulletin.

ALLIS-CHALMERS MANUFACTURING CO.
MILWAUKEE, WIS. U.S.A.

To Measure Low Resistances such as Field Coils of Motors, Armature Coils, etc., the Vawter Indicating Ohmmeter Is in a Class by Itself Independent of Voltage—No Adjustments Before Using

A real Indicating Ohmmeter for instantly reading very low resistances, such as the field coils of motors, generators, armature coils, etc. Measures resistances from one ten-thousandth of an ohm up.

The scale is uniform, accurate and reliable, and instrument requires one dry battery for its E. M. F. A one-man instrument, indicating ohms as a voltmeter indicates volts by simply pressing contact key.

Absolutely indispensable in all shops where motors and generators are built or repaired. Will save its cost in a short time and thereafter will make money for you in saving time every business day.

THOMPSON-LEVERING COMPANY

57th Street and Westminister Avenue
PHILADELPHIA, PA., U. S. A.



**MINIMIZE
MAINTENANCE
Cost
with
Cameron Products**

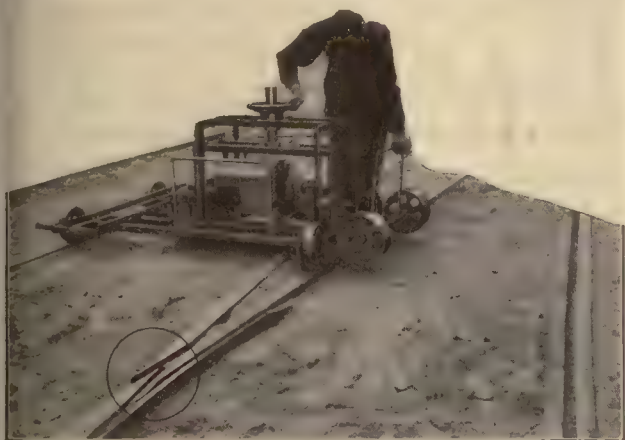
Cameron Coils—Wound to withstand that rush-hour overload that means a burnout with poorly insulated coils.

Cameron Bars—Pure hard drawn copper, giving high conductivity.

Cameron Commutators—Made tight by hydraulic pressure, eliminating loose bars and arcing brushes.

Canadian Amber—Gives soft, uniform wear and long life.

Cameron Electrical Mfg. Co., Inc.
Ansonia, Connecticut



**The
Seymour
MIDGET**

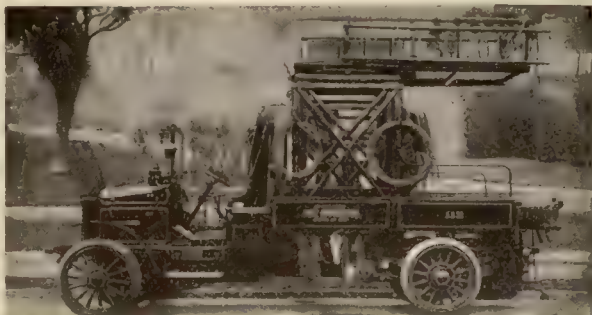
An Inexpensive Portable Rail Grinder

It's inexpensive but not cheap! It's efficient but not complicated! It's strong but not heavy! It's easy to operate, and inexpensive to maintain.

It's the Rail Grinder about which one delighted Roadmaster wrote us that he met an emergency involving the construction of five frogs on the job with less than a week to do it in—with the Seymour MIDGET.

Write for copies of testimonials.

E. P. SEYMOUR RAIL GRINDER CO., Waltham, Mass.



TRUCK WITH TOWER IN RUNNING POSITION

This 3-Section TRENTON TOWER

is not only more convenient, but stronger than the older type.

The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

We'll gladly send you details.

J. R. McCARDELL CO.
Trenton, New Jersey, U. S. A.



Reg. U. S. Pat. Office
Galvanized Iron and Steel
Wire and Strand

Incandescent Lamp Cord

AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE

TROLLEY WIRE

WEATHERPROOF WIRE
AND CABLE

PAPER INSULATED
UNDERGROUND CABLE

MAGNET WIRE

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Boston, 176 Federal; Chicago, 112 W. Adams; Cincinnati, Traction Bldg;
New York, 233 B'way; San Francisco, 612 Howard; Seattle, 100 1st Ave. So.



Drip Points for Added Efficiency

They prevent creeping moisture and quickly drain the petticoat in wet weather, keeping the inner area dry.

The Above Insulator—No. 72—Voltages—Test—Dry 64,000,
Wet 31,400, Line 10,000.

Our engineers are always ready to help you on your glass insulator problem. Write for catalog.

Hemingray Glass Company
Muncie, Ind.
Est. 1848—Inc. 1870

FLOOD CITY

Rail Bonds and Trolley Line Specialties

Flood City Mfg. Co., Johnstown, Pa.



ANACONDA
Copper Wire
111 W. Washington St., Chicago

Peirce Forged Steel Pins with Drawn Separable Thimbles

Your best insurance against insulator breakage

Hubbard & Company
PITTSBURGH, PA.



Electrical
Wires
and
Cables

JOHN A. ROEBLING'S SONS CO., Trenton, N. J.

Transmission Line and Special Crossing Structures, Catenary Bridges

WRITE FOR OUR NEW DESCRIPTIVE CATALOG

ARCHBOLD-BRADY CO.

Engineers and Contractors

SYRACUSE, N. Y.

Chapman
Automatic Signals
Charles N. Wood Co., Boston



\$

OUR CULVERT PRICES NOW LOWER THAN 1917

Our new price list (issued January 15th, 1922) on "ACME" (Nestable) and IMPERIAL Riveted Corrugated Culverts is strongly in line with the "Back to Normalcy" trend.

These new prices are really lower than ours issued the forepart of 1917—before we entered the war. Perhaps they are part of the reason why we are doing such a thriving business. Our factory is working right along. If you want culverts in a hurry this is the place to write for them.

If you want to save money on your next culvert order, get these new prices. Write today.



B. A. Hegeman, Jr., President
Charles C. Castle, First Vice President
Harold A. Hegeman, Vice-Pres. and Treas.
W. C. Lincoln, Mgr. Sales & Engineering
Fred C. J. Dell, Secretary

National Railway Appliance Co. 50 East 42nd St., New York City

Hegeman-Castle Corporation National Railway Appliance Co.
343 So. Dearborn St., Chicago, Ill. Munsey Bldg., Washington, D. C.
National Railway Appliance Co.
100 Boylston Street, Boston, Mass.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions	Drew Line Material and Railway Specialties
Anderson Slack Adjusters	Hartman Centering Center Plates
Genesco Paint Oils	Economy Power Saving Meters
Dunham Hopper Door Device	H & W Electric Heaters
Feasible Drop Brake Staffs	Garland Ventilators
Flaxlinum Insulation	Pitt Sanders
Anglo-American Varnishes.	National Safety Car Equipment
Paints, Enamels, Surfacers.	Co.'s One-Man Safety Cars
Shop Cleaner.	Central Equipment Company's
Johnson Fare Boxes	Hand Holds
Perry Side Bearings	

American Rail Bonds

CROWN
UNITED STATES
TWIN TERMINAL
SOLDERED
TRIPLEX

Arc Weld and Flame Weld

*Send for new
Rail Bond book*

**American Steel & Wire
Company**
CHICAGO
NEW YORK

BARBOUR-STOCKWELL CO.

205 Broadway, Cambridgeport, Mass.
Established 1858

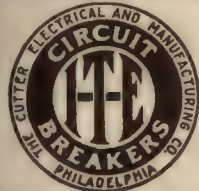
Manufacturers of

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for heavy street railway work are
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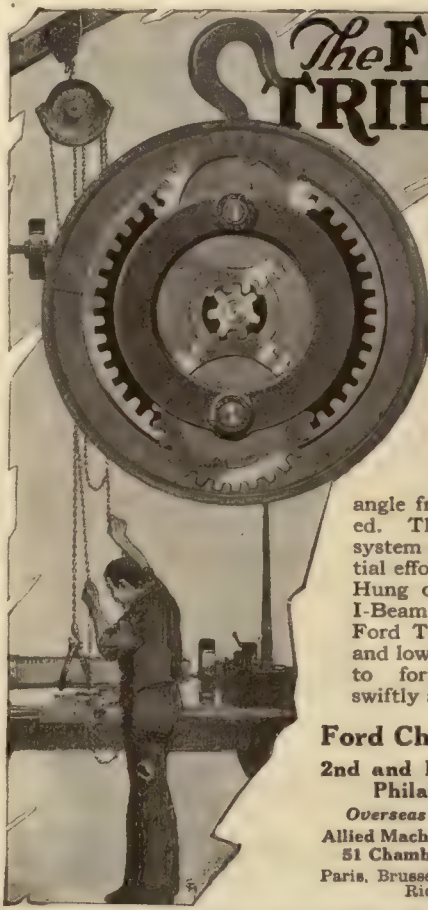
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**Hand-Operated
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All steel construction prevents any breakdown. The patented Loop Guide keeps the hand chain from gagging or overriding its wheel, no matter the angle from which operated. The planetary gear system multiplies the initial effort by twenty-five. Hung on rollers from an I-Beam trackway, the Ford Tribloc lifts, moves and lowers any weight up to forty tons—easily, swiftly and securely.

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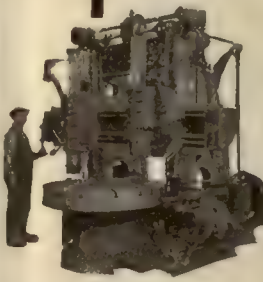
Overseas Representative:
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NILES-BEMENT-POND CO.


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FOR ELECTRIC RAILWAYS



Axle Lathes
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Seven sizes, 6 to 21 inches.

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of continuing reliability**

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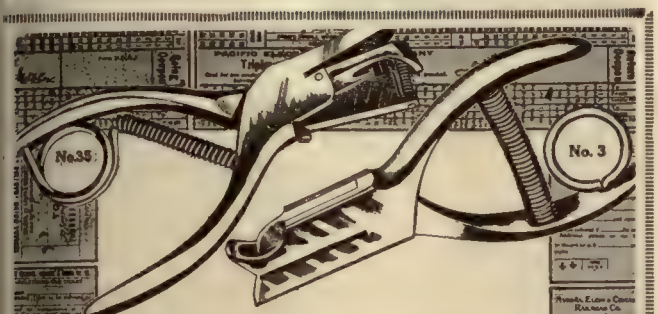
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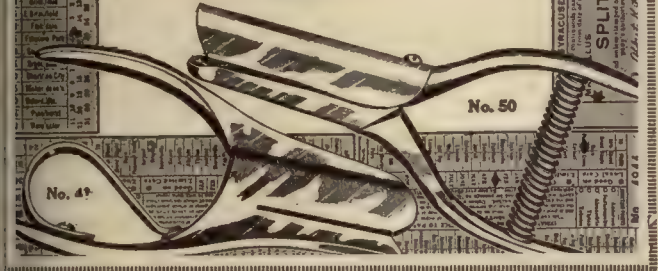
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The fact that the Quality of

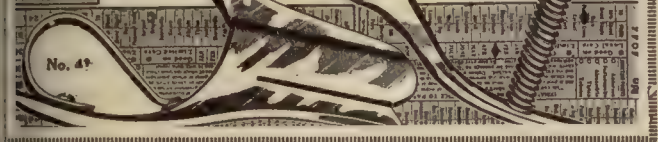
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(the punches with the Tool Steel Dies) has made them standard for the last 20 years should be the deciding factor on your selection.

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No. 4

"Personnel"—
or just employees?



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1917

AMERICAN RY.S.CO.

—a distinction!

Are your trainmen merely hired help, or do they constitute a well-knit, spirited body, proud of their jobs and reflecting the very best of the company's policies? American Brand Badges, Buttons and Punches lend "distinction" to the user.

American Railway Supply Co.
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402

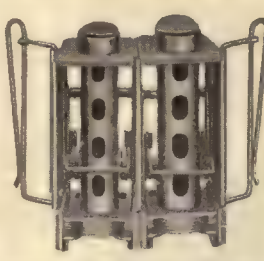
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COST NO MORE - LAST LONGER

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Adjustable
The best changer on the market. Can be adjusted by the conductor to throw out a varying number of coins, necessary to meet changes in rates of fares.

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Each barrel a separate unit, permitting the conductor to interchange the barrels, to suit his personal requirements and to facilitate the addition of extra barrels.

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REG. U.S. PAT. OFF. PHILADELPHIA, PENNSYLVANIA USA.

"American" Electric Railway Automatic Signals.
RECLAIMING MACHINES } for recovering
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Side Bearings and Center Plates

Reduce Your Power Bill and Make Your Cars Easy Riding

Flange wear is greatly reduced, rail wear decreased and derailments prevented. "Nosing" of truck is stopped. No lubrication. Car maintenance reduced. 200,000 in use.

Write for details.

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Electric Railway Sales Distributors: Holden & White, Inc., Chicago.
—National Ry. Appliance Co., New York—Ry. & Power Engrg. Corp., Toronto, Can.



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ELECTRIC RAILWAY JOURNAL

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ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

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FOREMAN or master mechanic; 14 years' experience; age 35; high grade references, go anywhere. PW-402 Elec. Ry. Journal, Real Estate Trust Bldg., Phila., Pa.

MASTER mechanic, 24 years' experience on city and interurban railways and 3 years in charge of maintenance for company operation 225 motor trucks. PW-403, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

YOUNG man, experienced as inspector, time table and chief clerk, would like to make change with chances for advancement. References. PW-397, Elec. Ry. Journal, Leader-News Bldg., Cleveland, O.

WANTED

Electric Railway Journal

WANTED—Issues of June 5th and 12th, 1920. State price. P. O. Box 83, Pennsylvania Station, New York.

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297—New Hunter Signs.

385—New Folding Vestibule Doors.

Transit Equipment Co.

Cars—Motors

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PAUL STEWART and COMPANY

First National Bank Building
Cincinnati, Ohio Telephone N. 2600Cable Address—Pasco, Cincinnati
Code Western Union 5 Letter—A BC 40 6 5th Edition

All Units Immediate Delivery

TURBO ALTERNATOR UNITS

- 1—10,000 kw. Allis-Chalmers 80% P. F. Condensing Turbo Unit, 60 cyc., 3 ph., 2,300-4,600-11,000 volts, 200 lb. I. S. P., 150-200 degrees superheat. Complete with surface condenser and auxiliaries.
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- 1—500 kw. Westinghouse Condensing Turbo Unit, 60 cyc., 2 or 3 phase, 2,200 volt, 3,600 r.p.m. Complete with surface condenser.
- 1—1,000 kw. General Electric-Curtis VERTICAL Condensing Turbo Unit, 60 cyc., 3 ph., 2,300 volt, 1,200 r.p.m. Complete with jet condenser.
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- 1—1,500 kw. General Electric VERTICAL Condensing Turbo Unit, 25 cycle, 3 phase, 11,000 volts.

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- 1—1,200 kw. General Electric M. P. Engine Type Generator, 250-500 volts, direct connected to tandem compound heavy duty Corliss engine.
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- 4—500 hp. B. & W. Steel Header Water Tube Boilers, 12 tubes wide, 51 tubes high, 200-lb. allowance. Complete with stokers and all fittings.
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- 1—250 hp. Heinie Steel Header Water Tube Boiler, 150-lb. allowance.

BOILERS

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- 1—500 kw. Westinghouse, 3 phase, 60 cycle, 260 volts A.C.; 600 volts D.C.; 400 r.p.m., with 2—300 kw. Westinghouse 2400/380 volt transformers, also switchboard.
- 2—300 kw. Stanley, 3 phase, 25 cycle, 360 volts A.C.; 600 volt D.C.; speed, 500 r.p.m.; complete, with suitable transformers, also panels.
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- 2—1000 kw. General Electric Synchronous Motor Generator Sets, each consisting of 1—1000 kw., 600-volt type MPC, 514 r.p.m., D.C. generator, and 1—1400 kva., 3 phase, 60 cycle, 2300/4000 volt, 514 r.p.m. synch. motor.

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the equipment or machinery that you are not using. This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards.

SELL IT BEFORE DEPRECIATION SCRAPS IT

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—LET IT HELP YOU ALSO

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FOR SALE

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A most unusual opportunity
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An article that sells in quantities and
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Give references and full information in replying to

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*They are
Uniform
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MOTOR gear
driven, built
for heavy duty as
well as for light
coil winding.

Write for partic-
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Manufacturers of Motor Repair Equipment.

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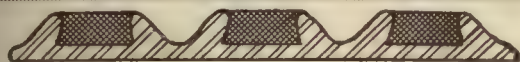
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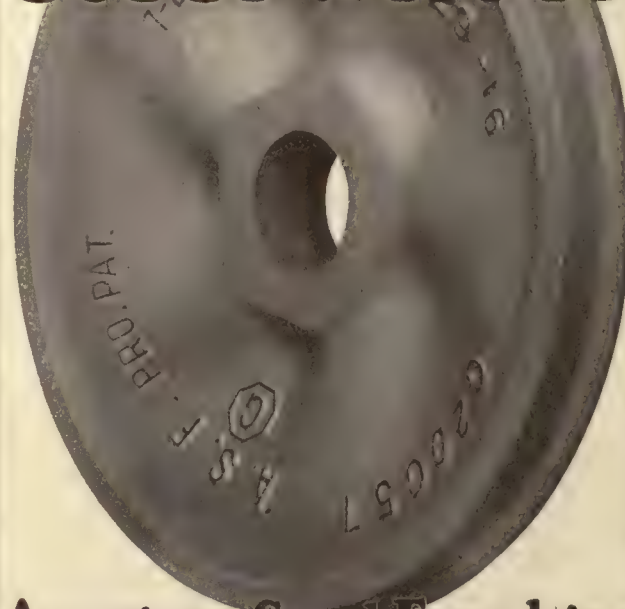
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—*it*
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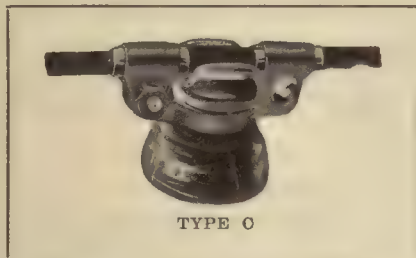
The window opens—affording instant relief from heat or lack of air, as well as opportunity to inspect the work, without removing the gear from the head. Speeds up welding.

The Ideal Face Shield is made of aluminum and vulcanized fibre to secure minimum weight and maximum durability. Glass can be removed and cleaned without tools.

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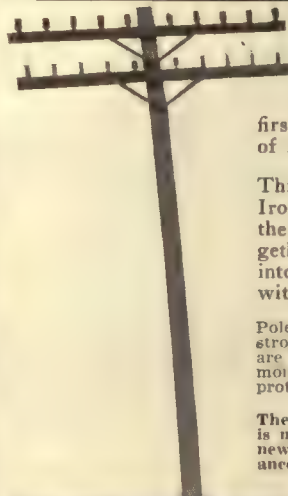
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This device, made of Armco Ingot Iron, is placed about the base of the pole in two halves, locked together with a key strip and driven into the ground with a sledge, or with the American driving jack.

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Seats illustrated are of Brill Standard Non-Reversible type. Pedestal, aisle plate and arm are of pressed steel and made in one piece. Simplicity of design, few parts and light weight, with durability of construction are its outstanding features.

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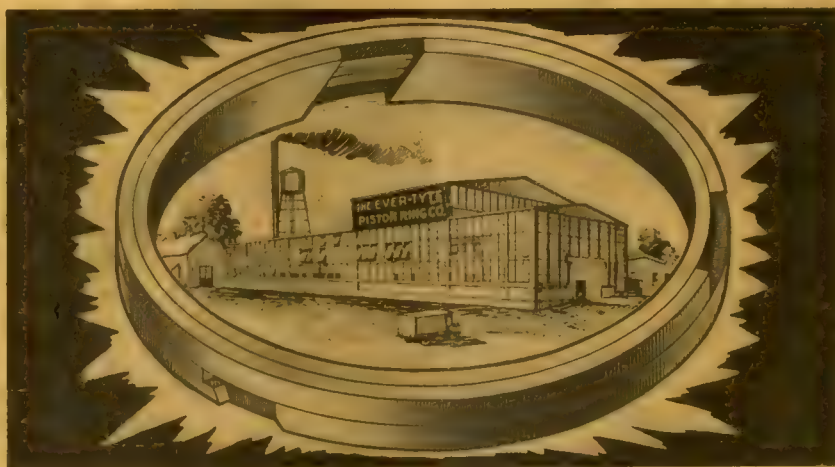


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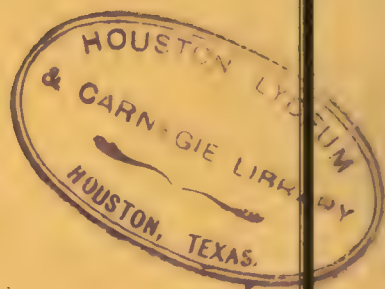
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Torrington, Conn.

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Read This Quotation From A Prominent Elec- tric Railway Operator:

"I further believe that Street Railways should purchase their material rather than manufacture it, unless there is some special reason for doing so. In most instances, where companies think that they can manufacture for less than they can buy, I believe that a proper cost accounting system would show them to be in error, and this applies particularly to the smaller companies."

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Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.



Westinghouse

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors

HENRY H. NORRIS, Managing Editor

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Assumed possession of system in September, 1921, when thirty-year franchise of private company expired. City has now largest municipal railway in North America and is spending eleven million dollars for immediate rehabilitation and extensions.		Premature standards which will hinder progress must be avoided but certain group dimensions should be established. The automatic treadle-operated exit door of the new double-door Chicago safety car is described.	
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Advertising, franchises, car design and wood preservation occupy attention of electric railway men. Joint sessions are held with the state gas and electric associations.		Numerous experiments with various methods of treatment and varieties of wood have been conducted by the Burlington Railroad during the past twelve years.	
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The well-edited house organ, proper newspaper contact and well-informed employees are the means of creating favorable public sentiment. Moving pictures in which the appeal is indirect are valuable in soliciting patronage.		A summary of the facilities which the parent association and its affiliated organizations have placed at the disposal of the members, and a statement of what the association is doing for the public.	
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BY BENJAMIN P. ALSCHULER		A vast amount of information covering the usual wide range of topics is brought in by committees of railroad engineers at their twenty-third annual convention. Material pertinent to electric railways is presented.	
To provide by ordinance the rate of fare is injurious to the public in the last analysis. Local ordinances should include provisions peculiar to each city while rates and service should be within the commission's power.		Meeting of the New England Association.....	530
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All feeling of the past is disappearing with the desire of both to improve service. Electric lines have created new traffic, relieved steam lines of short haul unprofitable to them and are natural feeders of the trunk lines.		Personal Mention	545
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MAXIMUM SAFETY!

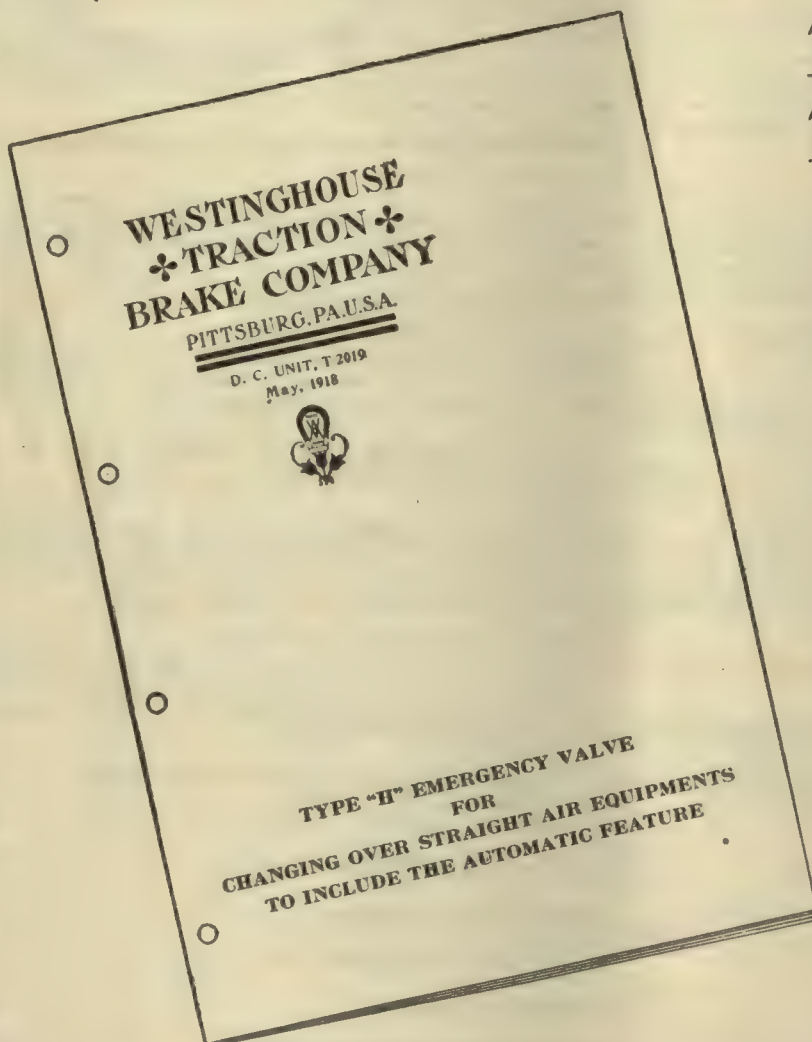


This Leaflet Tells You How

How to secure maximum safety in car operation by changing over your existing Straight Air Brake equipments to include the more advanced Automatic Emergency Feature is the subject of Descriptive Catalog T-2019, which is yours for the asking.

This change-over is accomplished easily and quickly, with slight expense, merely by adding the Westinghouse "H" Emergency Valve. The flexibility of the straight air equipment is not impaired and there is no change whatever in the brake valve or its manipulation.

The "H" Emergency Valve offers an economical solution of an important braking problem. Descriptive Catalog T-2019 tells you why.



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Our representatives are always available for analyses of operating conditions and to render such assistance as may be required in determining the best form of power brake for any class of service.

WESTINGHOUSE TRACTION BRAKES

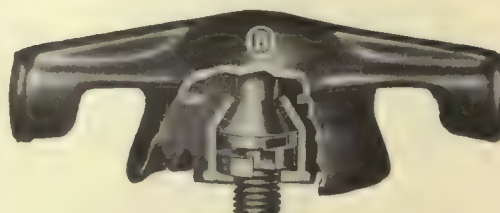
O-B Lock Trolley Hangers— A tighter, smoother line of longer life

Every ear fits up tightly to every O-B Lock Hanger. The drawings below show how ear and hanger become a rigid unit—weather-tight and time-proof. All the threads are protected. There is no vibration between ear and hanger.

The good features of the cap-and-cone and of the round top suspension are combined in the O-B Lock Hanger. It has the aligning feature of the first, it is as easy to install as the latter.

O-B Lock Hanger is a self contained unit, protected by O-B Sherardizing, insulated with Dirigo Composition.

Prompt Shipment.



O-B Type F Lock Hanger

When the ear is tightened it pulls the stud down against the heavy spring. The hanger is self-contained, with no loose parts.

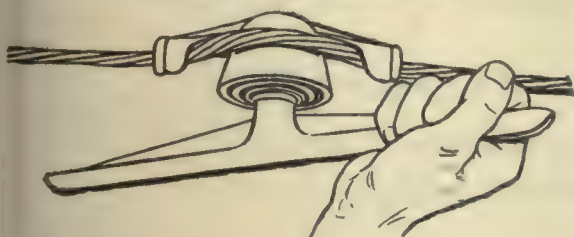
This is the way O-B Lock Hanger works—

Usually the ear is out of line with the trolley wire when it first makes contact with the hanger:



With Ordinary Hanger—

The ear must be backed off.

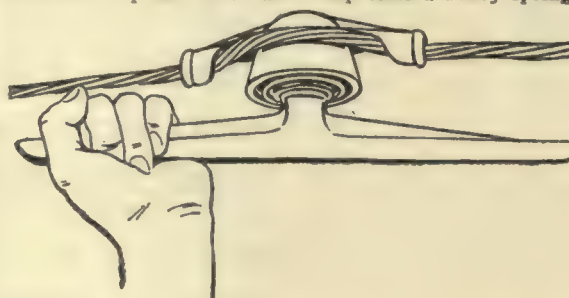


which leaves a loose joint between ear and hanger:



With O-B Lock Hanger—

After first contact, the ear is rotated still further: The stud is pulled down and compresses a heavy spring.



The result is a tight, solid joint between lock hanger and ear when the latter comes in line with the wire:



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Track Weather

WHEN the snow-plow is again parked back of the barn and the switches need no more salt, then it's time to think of track. To think of better track — and to think of better track is to think of STEEL TWIN TIE TRACK.

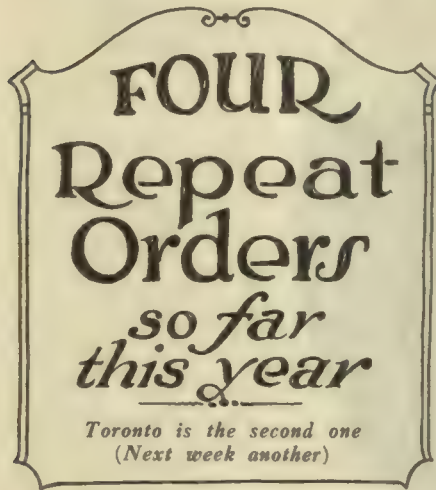
In offering to the industry, at this Season, a method of economical track construction dependent on the most efficient steel tie in use, we are glad to offer full cooperation in a complete investigation of its performance and costs.

The best initial step is an estimate using the 1922 price at your point of delivery.

THE INTERNATIONAL STEEL TIE CO.
CLEVELAND

Steel Twin Tie Track

The City of Toronto—



Watched costs—then bought

8 More DIFFERENTIAL CARS

Toronto's Story

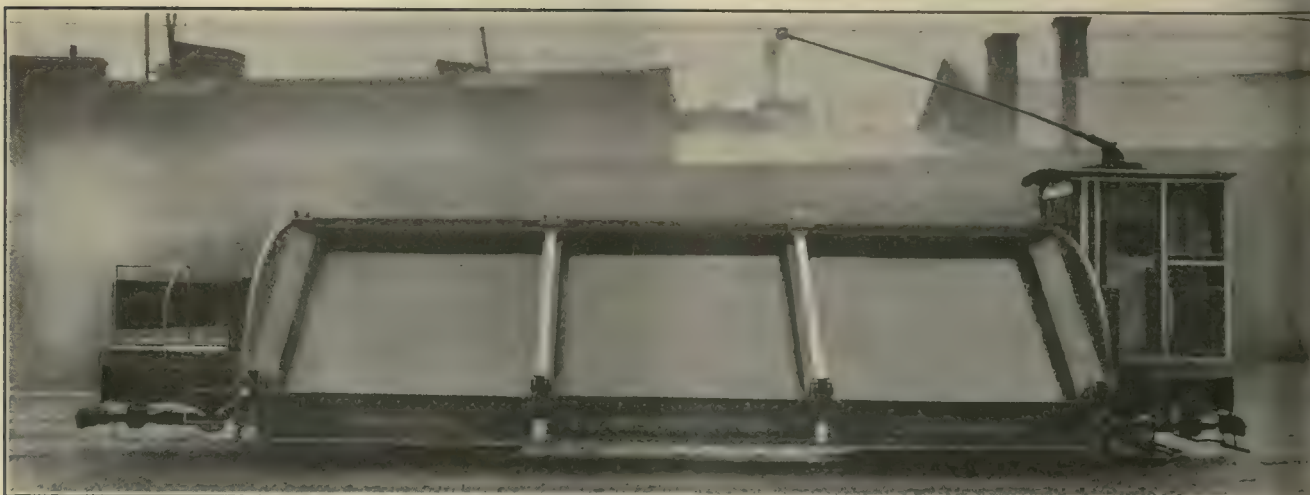
1921 — 3 *Differential Cars*

1922 — 8 *Differential Cars*

It took only three months for the engineers of the Toronto Transportation Commission to find out that they could place materials with Differential Cars at even less than one quarter of the cost by other methods. Then they ordered eight more for their program of track construction and maintenance.

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Check off your wants
and send for respec-
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The best way to judge a case is to try it. Ask any judge.

The Keystone Steel Gear Case is a light case, riveted and spot-welded to stand the gaff of the roughest roadbeds. It's oil-tight and dirt-proof. These qualifications can be expected of this gear case.

Made for use with all types of motors. Send for data sheets.

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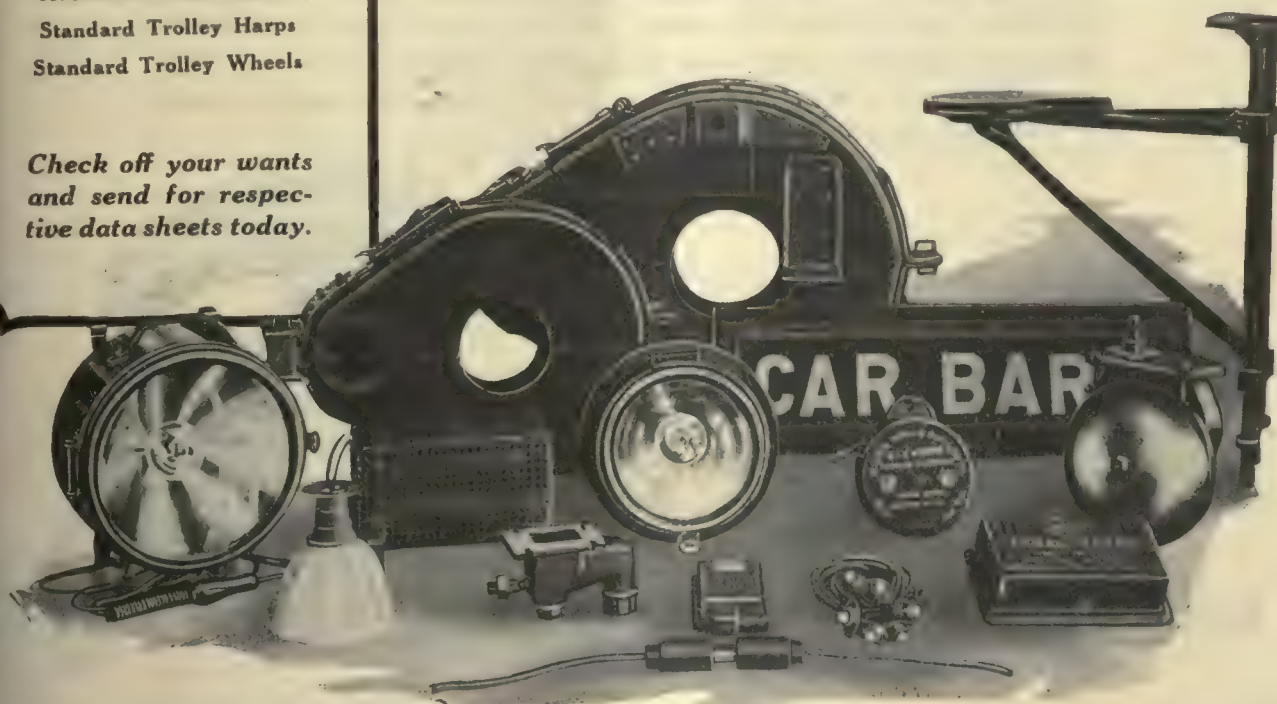
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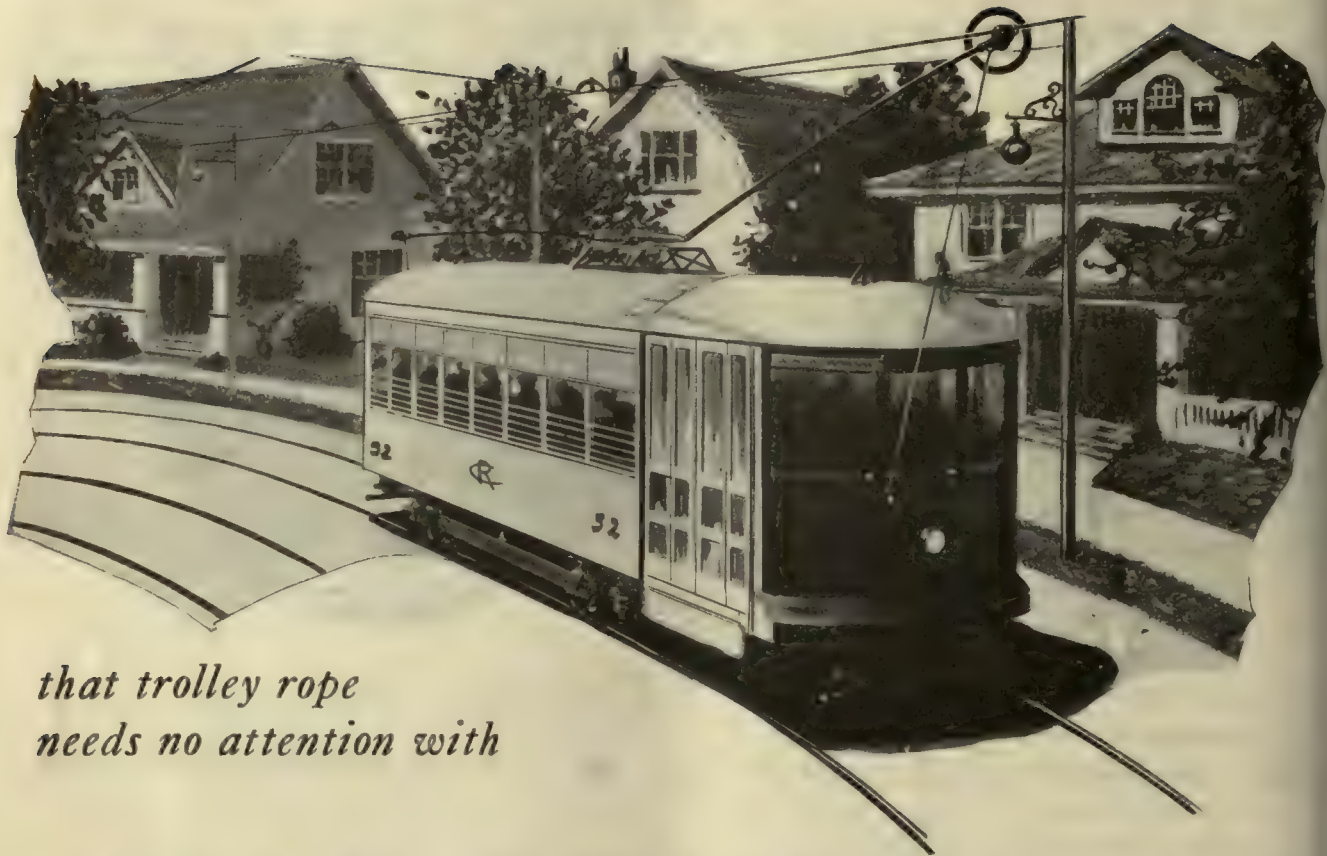
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needs no attention with*

MILLER TROLLEY SHOES

(Patented)

They Cling to the Wire

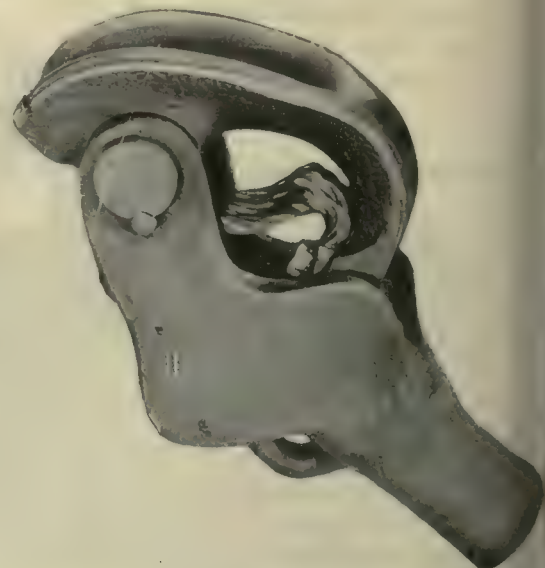
The one-man car operator cannot get his car over the road if he has to keep going to the rear to replace a dewired trolley. He can't be blamed for torn-down spans.

Eliminate these troublesome features of one-man car service by using Miller Trolley Shoes. They do away with jumping and arcing—and they are lower in maintenance cost.

One-Man Car Service

can be made a source of satisfaction and economy with Miller Trolley Shoes. They meet every requirement for increased efficiency.

Miller Trolley Shoe Company
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Snappy Service Coming

On Those Frankford Philadelphia Cars

Three 4-ft. doors on each side mean least number of steps for the passengers.

National Pneumatic door control means *quick* opening and closing of doors.

National Pneumatic electric contact tripping shoe means *safe* opening and closing, the closing doors reversing at once if they touch a passenger.

National Pneumatic push-button control placed at car ends permits guard to control *two* cars at once; and there are outside buttons for station guards, too.

Finally, pilot lamps tell both motorman and guards that the doors are closed *right*.

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Motorman's Light Signals

Door and Step Control
Safety Interlocking Door Control
Multiple Unit Door Control

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As a factor in its campaign for the highest efficiencies in giving good street car service in a large metropolitan district, the Philadelphia Rapid Transit Company has just placed a very large order for Sangamo ECONOMY Railway meters sufficient in number to equip all its street railway cars.

This notable purchase is made after nearly two years' use of 310 similar ECONOMY Meters purchased in 1920 and used to completely equip the cars of its Callowhill Division. The energy saving induced and the car inspection and maintenance savings made on this division as well as the operating reliability and low maintenance cost of the meters have fully justified the present installation of Economy Meters on the entire street railway system of Philadelphia.

Standard on nearly 100 roads
Saving $\frac{1}{3}$ to $\frac{1}{2}$ cent per car mile

PHILADELPHIA

EE EQUIPPED WITH

METERS

and CAR INSPECTION

*By 310 Meters
ago Justified the
Note the Reasons*

First, the meter induced car energy savings which more than equalled the operating and capital charges against the meters at the end of 12 months.

Second, in addition to energy savings, the inspection of rolling stock on the kilowatt-hour basis not only proved the correctness of this principle but effected substantial economies in inspection cost.

Finally, the combined effect of the two foregoing benefits was further evidenced by a greatly reduced number of car equipment failures.

Philadelphia will operate with an Economy Meter on every street car and will inspect all cars on the kilowatt-hour basis henceforth.

Let us prepare an estimate for your conditions.



At Philadelphia the Economy Meters with Car Inspection dials serve a double purpose—power-saving and car inspection. Utilizing the meter to announce the car inspection interval avoids useless inspections and protects against missed inspection. Each car is held in for inspection whenever and only when it has done a full, safe, predetermined amount of work.

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Ground Pinion Bores

assure a correct fit
on armature shaft
and prevent injury
to the shaft taper.



In Multiple Unit Service

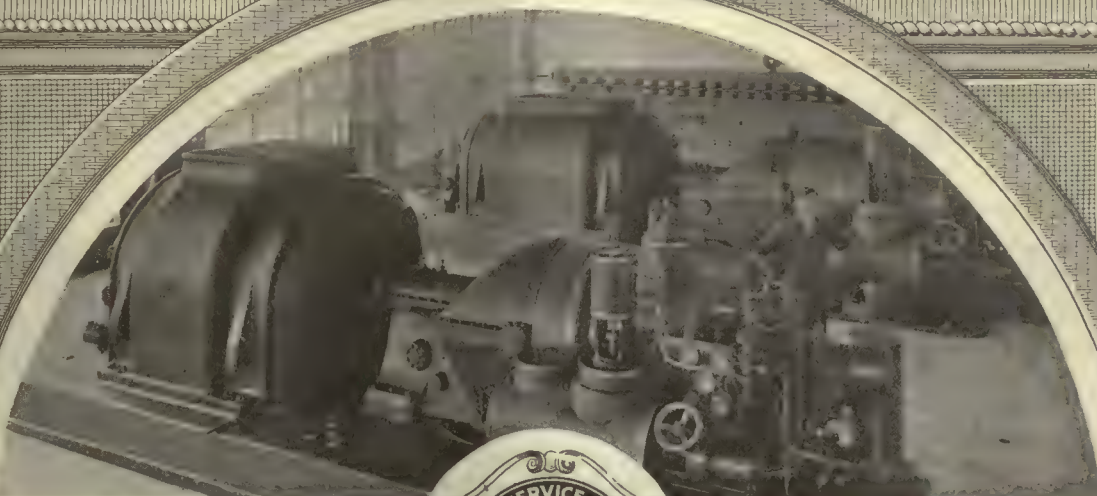
An Operator Reports:—
"The Helical Gears in-
stalled on this property
are giving excellent serv-
ice and bearing wear has
not been greater, if as
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gears."

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These oils are giving exceptional service on both unit and gravity systems in turbine lubrication and the lighter grades have demonstrated the value of oil quality, where used in high speed light turbines, reciprocating engines and fast running machinery of all kinds.

*In the world of lubrication Galena Quality
is always interpreted as "The Best."*



Galena-Signal Oil Company

New York

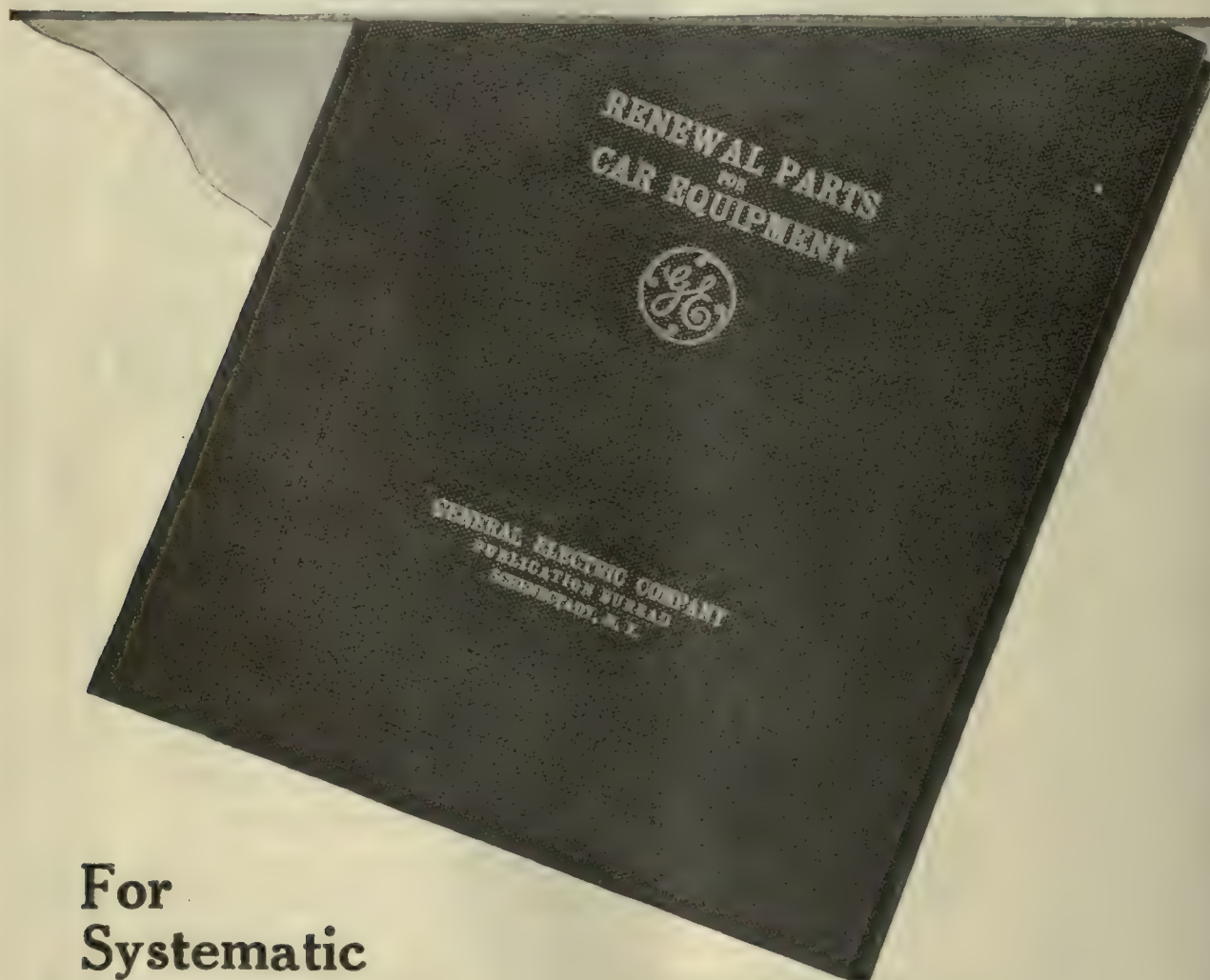
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Electric Railway Journal

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Volume 59

New York, Saturday, March 25, 1922

Number 12

The New York Valuations

ON THE resumption of the valuation hearings by the New York Transit Commission on March 20, the companies, in starting to present their side of the case, their opinion and evidence, very properly protested against the commission accepting the recommendations of its own valuation bureau. It will be recalled that on Feb. 20, when these hearings opened with the bureau's testimony—and then adjourned to be reopened March 10—four sets of figures were presented and one of these recommended, *i.e.*, that based on estimated original cost. Comment as to the significance of this valuation and recommendation was made in these columns in the issue of Feb. 25. Suffice it to repeat that these figures are testimony only—proper and necessary as a part of the complete picture—but they are testimony only. A fifth figure is yet to be presented, based on the future earning capacity of each of the roads upon the basis of the 5-cent fare and present conditions of management.

It is of no use to enter upon an academic discussion of the basis or theory of valuation—the rule is pretty clear by this time. *Smith vs. Ames* is still controlling. The United States Supreme Court has named as some of the things to consider:

- The original cost of construction,
- The amount expended in permanent improvements,
- The amount and market value of its bonds and stock,
- The present as compared with the original cost of construction,
- The probable earning capacity of the property under particular rates prescribed by statutes.

It is to be expected, therefore, that the commission in determining value will consider Mr. Madden's figures merely as evidence. It would be a peculiar and anomalous position for the city or state to take, after the companies have been struggling along under increased prices of operation for a number of years on the theory held by the city that it is not responsible for increased cost, but that the whole burden must be borne by the companies, that appraisals should be based primarily on prices of many years ago. A basis adapted for operating expenses ought to be a good basis for costs or value in any appraisal of physical property.

Some of the companies in their arguments are presenting figures for consideration on a basis which is somewhat analogous to "historical cost." In some cases these figures are the lump sum capital expenditures made in order to produce the present systems. There is much to support historical cost as a very weighty piece of evidence, and the fact that many of these expenditures were made with the full knowledge and official sanction of the public's commissions then in power should tend to give them more weight than ordinarily in determining fair values. These values exceed those recommended by Mr. Madden, but in general are less than Mr. Madden's estimate of reproduction cost on the basis of present day prices.

Other figures yet to be presented are those on the

estimated future earning basis with a 5-cent fare, and some of the companies claim that these will show a much higher figure. The reason for this is that under their original franchises, granted to individual companies, the ride possible for a single 5-cent fare was comparatively short, and it has been only through consolidations during the last thirty years that the ride possible for the 5-cent fare has been lengthened in many cases. Any such basis of valuation also should presuppose intelligent co-operation in the way of traffic regulation, etc., by the city authorities, at least to the extent that such co-operation is being afforded in other large cities in the country. As the commission's consulting engineer, Mr. Turner, has pointed out, the operating expenses per car-mile of all the surface lines in Manhattan Borough are close to 60 cents. This is much too high and due very largely to the low speed of the cars, which is less than 7 revenue car-miles per car-hour. With an increase in this figure of from 40 to 50 per cent, the appraisal figures on the basis of a 5-cent fare ought to be considerably higher than those on the so-called "original cost."

When the evidence is all in, the commission must then tackle what the Supreme Court of the United States calls the "embarrassing question" of reaching a conclusion as to "fair value." Actually, and properly, the controlling factor, if it follows leading commission decisions in fact, rather than in theory, will be that value which will make it possible for the railways to continue in successful operation, to furnish satisfactory service to the public at a fair price. This is the "value" for them to determine.

What Are the Requirements of the Best Kind of Electric Railway?

AN ANSWER to this question must be given by three arbitrators as a result of hearings now being conducted in Toronto to determine the amount to be paid by the city of Toronto to the railway company there as recompense for the property which the city took over last September. This measure for determining the value of a railway system is a unique one. Usually the method followed in the United States is reproduction value on some basis of unit cost prices. There is no constitutional provision in either Canada or England corresponding to the one in this country by which private property cannot be taken without compensation, but the Toronto case is not affected by that fact.

The words quoted in part above defining the basis of settlement in the Toronto franchise read in full as follows:

In arriving at such value, the arbitrators are to consider and award only the value of the said several particulars to the city at the time of arbitration, having regard to the requirements of a railway of the best kind and system then in operation and applicable to the said city.

These words form part of the contract under which the company thirty-one years ago agreed to sell its property to the city, and there seems to be no reason

why the question should not come up in the United States in similar circumstances.

Obviously, the purpose of the original contract was that the property should be valued on a service standard; that is to say, the cars and rails were not to be taken over either at their second-hand value or at their original cost, but at an intermediate price, depending on their usefulness. But in the determination of this value, was the equipment to be compared with that of a high-grade electric railway of about the same size elsewhere, or do the words mean that the Toronto equipment taken over is to be compared with an ideal property, with all its physical property brand new? If the former is the case, it is natural to assume that the older equipment of the Toronto company or the greater part of it must be valued at a fairly high service standard, because a very large proportion of the equipment of every large electric railway company, even of "the best" electric railway companies, is obsolescent if not actually obsolete. On the other hand, if the words mean that everything has to be judged on the basis of what absolutely new or practically new equipment would do, the present Toronto equipment would have a much less value.

It is easy to see that other queries might easily arise in the settlement of this question. For instance, if the second theory should prevail, whose opinion should be selected as to what is the best type of cars and rails to use in a city the size of Toronto? On this point the opinions of experts even for the same property would differ widely.

Altogether the conclusions of the arbitrators on the meaning of these words promise to be of interest, even if there is no similar question in other pending valuations for which they could serve as a precedent.

Development of the One-Man Car Is Going Forward

A YEAR or so ago, if any one had read a paper proposing a design of one-man cars different from the so-called standard safety car, there would have been a vigorous defense of the standard design and serious objection raised to any change. At that time, there were many who realized that if the one-man car was to be used under certain traffic conditions, a change in the so-called standard would be desirable, but any suggestion along the line met with decided opposition—even ridicule. The editors of this paper were urged to give less space to views on changes in one-man car design and were criticised when they pointed out that while the standard form had many advantages the field of the one-man car might be greatly extended by a car with double doors and a little more generous dimensioning.

During the past twelve months or so there has been a notable change in this attitude. First, there was the development of the double-door one-man car in Madison, an account of which was published in this paper a year ago this month. Then came the double-door car in Baltimore, a full account of which was made public last September. Then came the two types of safety cars developed for use on the Chicago Surface Lines; then the turnstile cars, described by Mr. Sweet at the New York State convention and in use in Syracuse and Utica; and most recently the Connecticut Company double-truck cars described in the Feb. 18 issue of this

paper. The order here cited is simply that in which information about these cars was made public, not necessarily the order in which the cars actually were developed. At first, these variations from a standard type of car aroused the same kind of opposition which was mentioned earlier in this editorial, but there must now be a feeling that variations are inevitable. The paper by H. H. Adams at the Illinois convention last week elicited at that meeting no comment but commendation of this effort to design a car to suit a particular set of needs.

There is a proverb that hope springs eternal in the human breast, and when the Birney car was developed and its use spread to many cities operating under various conditions of traffic, there was undoubtedly some ground for the belief that a universal car had finally been evolved or at least a car which would be suitable for perhaps 60 to 70 per cent of all surface city traffic. This meant a realization of the long held ideal that cars could be built for stock and, so to say, could be produced in quantity and sold "off the shelf" like so many standard bolts or cans of vegetables. Naturally this would or should, bring about a material reduction in manufacturing costs over the special car. Hence there was the strong effort to establish standardization along the lines of this car and the consequent disappointment when variations began. Incidentally, some railway men felt that the promised saving in cost, due to the one design, had not been fully realized.

Actually, the cause for these variations was not that the Birney car was not adapted to a great many conditions. The cause was, rather, that it was almost, not quite, an impossible task to design any one car which would be best adapted for all conditions of electric railway service, including various lengths of passenger riding, varying extents of passenger interchange, different rates of acceleration desired, habits of people, etc.

Mr. Birney's great contribution to the industry was not the design of a car about 28 ft. long, 8 ft. wide and seating thirty-two passengers. Instead, it was first the establishment on a large scale of the important fact that with a suitable car, equipped with the proper timing saving and other appliances, a single operator was able to perform the functions of both motorman and conductor under widely varying conditions of traffic. In the second place, he turned the tide against the low heavy car and convinced the industry of the economy of light weight, of the resulting skip-stop effect of the small load and of the traffic advantages of short headway.

Much as the fact is to be regretted from the standpoint of cost, the hope of a standard car for all conditions must be given up by those who held it. This does not prevent, however, much progress along the lines of standardization. The extent to which the original Birney car has been found to be adaptable to different classes of service should be an object lesson in the future. There should not now be the same desire for slight variations which affect the cost of construction. As long ago as 1915 this paper pointed out that a great saving in car costs would follow the general adoption of standard spacings between sideposts, standard window sizes, standard contour of roof, one or two standard widths and three or four standard lengths. Such standardization would bring about a material reduction in manufacturing costs over the special car, perhaps almost the same extent as would a standard car itself.

Toronto Takes Over Street Railways

Assumed Possession of System in September, 1921, When Thirty-Year Franchise of Private Company Expired—City Has Now Largest Municipal Railway in North America and Is Spending Eleven Million Dollars for Immediate Rehabilitation and Extensions—Construction of Terms in Original Franchise in Regard to Payment for Property Taken Over Now Being Considered by Arbitration Board



LOOKING EAST ON KING STREET AT YONGE STREET, FEB. 18, 1922, AT 12:45 P.M. THIS SHOWS A TYPICAL CONDITION DURING A SATURDAY NOON RUSH HOUR

WHEN the city of Toronto in September last took over the property of the Toronto Railway it acquired a system which, at least in number of cars owned, is larger than that of any other municipal railway in North America. The Toronto Railway operated about 143 miles of track and 830 cars. In addition to this property the city owns what are known as the Toronto Civic Lines. The construction of these lines was commenced by the city about ten years ago and since then they have been operated by the municipality. They comprise about 22 miles of track with twenty cars and have been combined with the property taken over from the Toronto Railway. The city has also taken over and is now operating the city portion of the Scarborough division of the Toronto & York Radial Railway, 1.87 miles in length. Further, the city plans to take over soon and operate in conjunction with its present system the portions within the city limits of the several remaining radial or interurban lines built or operated by private interests. Table I shows mileage of track and cars taken over from the Toronto Railway and those belonging to the Civic Railway.

Exclusive of the 20 miles or so of track in the yards, the mileage comprised in the entire system, including the portions of the Radial Lines to be taken over, will be approximately 179 miles. On the basis of about 30,000 inhabitants in the city proper, this gives Toronto a mile of track for every 3,000 resident population. Including the immediately adjacent communities, the population of the city amounts to about 75,000, exclusive of a floating population of about 10,000. At present about 950 cars are operated at the

maximum rush-hour peak. During the middle of the day the service calls for 390 cars, with headways of about four minutes on the different lines. In addition to street car service, the city is now operating two motor bus routes with seven gasoline buses, and expects

TABLE I—SHOWING MILES OF TRACK AND CARS BELONGING TO THE PRESENT TORONTO SYSTEM

	Toronto Railway	Civic Railway	Added Since Sept. 1, 1921	Total o Feb. 1.
Miles of single track:				
In streets.....	132.99	21.09	7.25	161.33
In carhouses.....	9.83	1.26	6.61	17.70
Cars				
Double-truck pay-as-you-pass.....			190	190
Double-truck trailers.....			60	60
Old double-truck closed.....	475	37		512
Old single-truck closed.....	234	33		267
Old single-truck trailers.....	121			121
Service cars.....	50	3	4	57
Carhouses.....	1*	3		4
Shops.....	1			1
Substations.....	5	4	1	10

* In addition to the five carhouses belonging to the Toronto Railway taken over by the city, the company had a small frame carhouse which it still owns.

soon to augment this service with four more gasoline buses and four trolley buses. The revenue passengers per day average 550,000.

During the latter part of its franchise the company had no inducement to put new equipment in service because there was no guarantee that it would be taken over by the city at what the company considered fair value. In consequence there was a reduction in the service as shown in Table II.

A brief account follows of the events which preceded and led up to the acquisition of the property of the Toronto Railway by the city. This account will show that history repeats itself in Toronto as elsewhere.

TABLE II—SHOWING REVENUE PASSENGERS AND OPERATING EXPENSES PER CAR-MILE YEAR ENDED JUNE 30

Reference Ontario Railway and Municipal Board		
	1915	1920
Passengers.....	6.53	9.03
Expenses (cents).....	15.42	30.58

When the Toronto Railway gave up its railway system in September, 1921, it did just what an earlier company had done thirty years previously at the expiration of its thirty-year franchise.

FIRST STREET RAILWAY IN 1861

The first street railway system in Toronto was established in 1861, when a franchise for thirty years was granted to Alexander Easton and others. Under this

not advanced to admit the transfer being made. The city assumed possession on May 20, 1891, the amount of the award being \$1,453,788, and it immediately advertised for bids for a new company on a thirty-year franchise. At that time the system was still being operated by horses.

Tenders were requested on four different bases as to fares, guarantee of company bonds, etc. Several tenders were received, and the franchise was finally awarded to a company made up of Henry A. Everett, who was then largely interested in the Cleveland Railway; William McKenzie, a large contractor in Toronto; George W. Kiely, who had been connected with the previous company, and others.

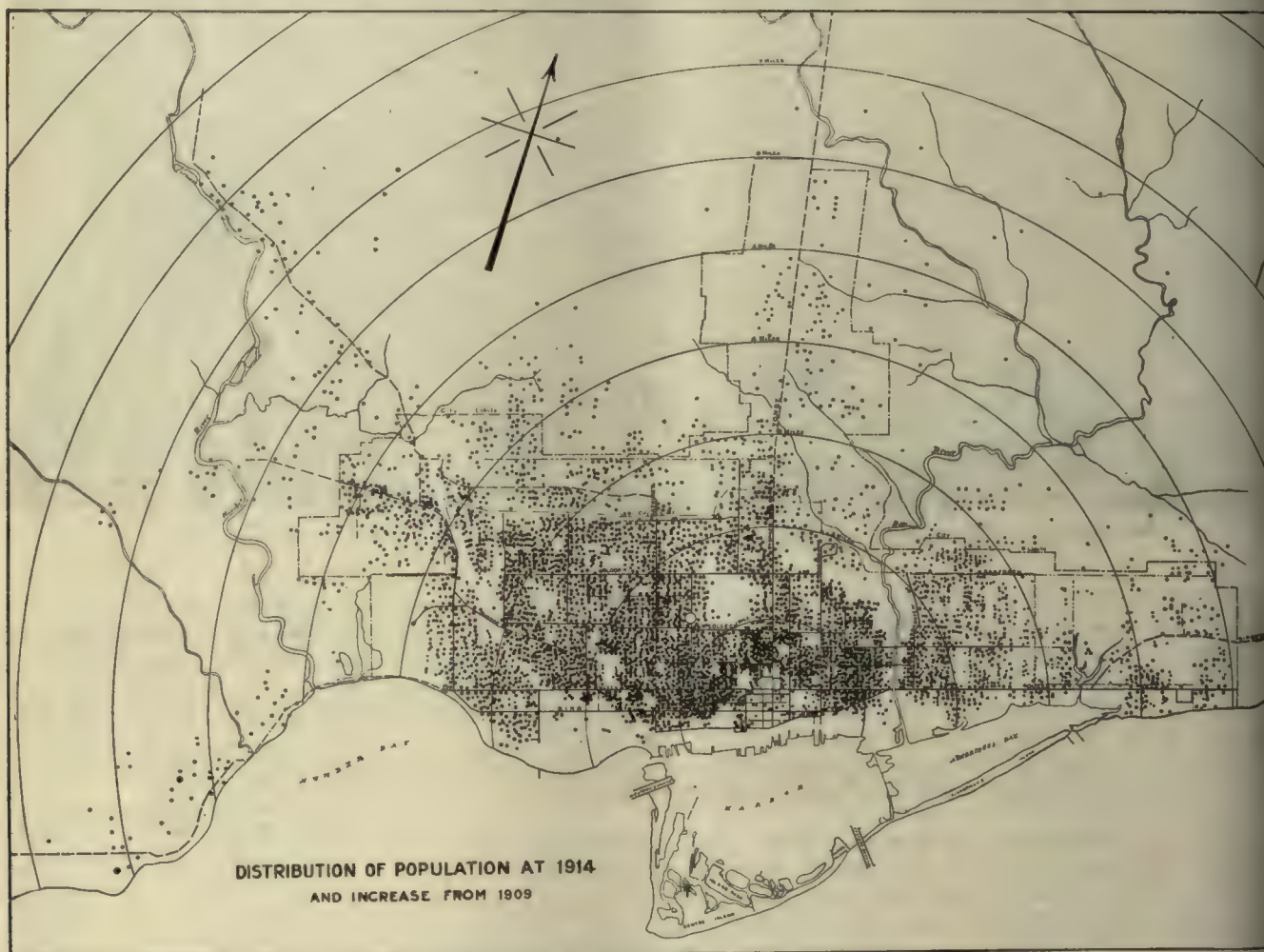


FIG. 1—DIAGRAM SHOWING DISTRIBUTION OF POPULATION IN AND AROUND THE CITY OF TORONTO, 1914. EACH DOT REPRESENTS 100 PEOPLE

franchise the only payment made to the city was a license fee of \$5 per car per year. Afterward, in 1889, a payment of \$600 per annum for each mile of single track used by the company was made in consideration of the construction by the city of the pavement required in connection with the tracks and the maintenance of this paving. The rate of fare was 5 cents, and tickets were sold at six for 25 cents and twenty-five for \$1, with school tickets at a reduced rate. No transfers were given and no night cars were run, and under city ordinance no cars were permitted in service on Sunday.

According to this franchise the city had the right to take over the property at the end of the franchise, but on its expiration on March 26, 1891, an extension of time was necessary because the arbitration proceedings had

The company took over the property from the city on Sept. 1, 1891. Some of the features of the franchise were as follows:

PRINCIPAL FEATURES OF FRANCHISE OF TORONTO RAILWAY

1. The company received the exclusive right and privilege of using and working street railways in Toronto during the continuance of the franchise, except on that portion of Yonge Street, north of the Ontario & Quebec Railway (now Canadian Pacific Railway) and that portion of Queen Street (Lake Shore Road) west of Dufferin Street. On these excepted portions of the city, the company was also entitled to privileges in so far as the city had the power to grant franchises for the full thirty-year period that did not interfere



with the rights of existing street railway corporations on these streets.

2. If, at the end of the thirty-year franchise, the city desired to exercise the right of taking over the property necessary to be used in the working of the railways, at least twelve months notice must be given to the railway company to this effect. In case such notice was not given, the franchise became automatically extended from year to year. In this case, however, the city had to give only six months notice to the company of its intent to take over the property. If such notice was given, the franchise provided for an arbitration board to determine the value of the property. In such arbitration the franchise declared that the board must use as a measure of value "a railway of the best kind and system then in operation." The full wording of this clause follows:

In determining such value, the rights and privileges granted by the said agreement and the revenue, profits and dividends being or likely to be derived from the enterprise are not to be taken into consideration, but the arbitrators are to consider only the actual value of the actual and tangible property, plant, equipments and works connected with and necessary to the operation of the railways, which is not to include any land, property or rights acquired or used in connection with the said street railway, and which do not actually form a part of the said street railway undertaking necessary to the carrying on of the same.

In arriving at such value, the arbitrators are to consider and award only the value of the said several particulars to the city at the time of the arbitration, having regard to the requirements of a railway of the best kind and system then in operation and applicable to the said city.

3. The company was to pay for the construction of all track, i.e., rails, ties and fastenings, but the city was to pay for the cost and maintenance of all foundations and pavements and of all repairs to the same except those caused by the railway when it had to tear up paving to make repairs to its tracks. This has to be made good by the company. The company had to keep its tracks in a state of thorough efficiency and to the satisfaction of the engineer of the city, and to remove, renew, or replace the same as circumstances might require, and as the city engineer might direct.

TYPICAL VIEWS IN TORONTO

The upper view shows Queen Street at 5.15 p.m. Feb. 15; the one below Yonge Street at 1:10 p.m., Feb. 18 (Saturday); the lower view Yonge Street at 4:45 p.m., Feb. 16 with zero weather. The large number of autos should be noticed; yet with only 42 ft. wide roadways, the crossing at Yonge and Queen Streets carries 209 trains on Yonge and 104 on Queen during the maximum afternoon rush hour.

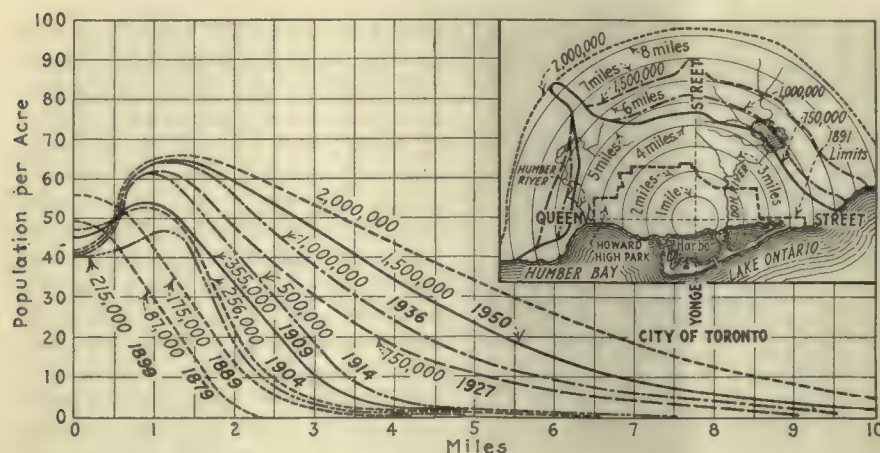


FIG. 2—COMPOSITE CURVES OF POPULATION DENSITY IN TORONTO

When streets were to be paved in a permanent manner by the city, the track also had to be reconstructed according to the best modern practice as approved by the city engineer.

4. The company was to pay the city \$800 per year per mile of single track. (This figure was considered to be roughly in lieu of pavement charges paid by the city as outlined above.) The company was also to pay the city a percentage of its gross receipts as follows: Up to \$1,000,000, 8 per cent; between \$1,000,000 and \$1,500,000, 10 per cent; between \$1,500,000 and \$2,000,000, 12 per cent; between \$2,000,000 and \$3,000,000, 15 per cent; on all gross receipts over \$3,000,000, 20 per cent. (This payment was considered to be equivalent to a tax on its franchise, and the company was exempted from all other taxes except school and real estate taxes.)

5. Fares were to be as follows: Single fare, 5 cents, except between midnight and 5:30 a.m., when the fare was to be 10 cents. Tickets good at any time except on the late night cars, six for 25 cents and twenty-five for \$1. Limited tickets, good between 5:30 a.m. and 8 a.m. and between 5 p.m. and 6:30 p.m. eight for 25 cents. School tickets, with the usual restrictions, ten for 25 cents. In addition to the above, free transfers had to be given.

6. The railway company agreed to build and equip a factory in the city for the manufacture and repair of all cars used on the railway during the life of the franchise.

7. A track gage of 4 ft. 10 $\frac{1}{2}$ in. had to be maintained, and track grades had to conform to street grades.

8. The railway company was not permitted to extend beyond the then city limits without conforming to cer-

tain regulations, so that if the city should extend its territorial limits, these extensions would be governed by regulations similar to the main franchise, and the franchise for them would terminate on Aug. 31, 1921. All such extensions had also to be built as recommended by the city engineer and approved by the City Council. (The practical effect of this clause was that few extensions were made, and this prompted the construction by the city of the Civic Railway lines in 1910-11-12. It was the position of the company not only that it was under no obligations to go outside the city limits of 1891 but that it was not permitted to do so under the franchise. Litigation

followed this statement of position, and the case was finally taken to the Privy Council in London, England, where the position of the company was sustained. Probably much of the prosperity of the company during the first twenty years of its franchise was due to the fact that its activities were confined to the highly congested central territory of Toronto.)

9. The railway could purchase land to operate pleasure resorts, but in case the city took over the railway

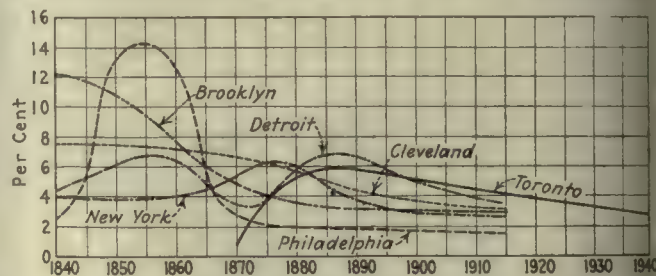


FIG. 4—CURVES SHOWING PERCENTAGE OF ANNUAL INCREASE OF POPULATION IN VARIOUS CITIES

in 1921 such lands or real estate would not be a part of the property acquired by the city.

10. Track allowances had to be kept free from snow and ice by the railway. In case the snow fell to more than 6 in. in depth, it had to be carted away at the expense of the railway.

11. Employees must not be required to work more than ten hours a day, or sixty hours a week, or six days a week, and no adult employee shall be paid less than 15 cents an hour.

12. Sunday cars were not permitted. (Sunday service began in 1897 under a supplementary agreement.)

ENTERPRISE AT FIRST SUCCESSFUL

In an interview with Mr. Everett in 1895, four years after the line was taken over by the new company, Mr. Everett said in part as follows:

"The cash capital of the Toronto Company paid in was \$600,000, for which \$6,000,000 worth of stock was issued. This is selling in the market at the end of three years for \$75 (par value \$100), which is an increase of \$3,780,000 over the investment of \$600,000 three and a half years ago. The property has been bonded for \$2,800,000 in 4 $\frac{1}{2}$ per cent, twenty-three year sinking fund bonds, which were sold on a 5 per cent basis. We have paid no dividends as yet, but the accrued profits for the three years and four months have been \$629,000.

"The reduction of fares (over those prior to Sep-

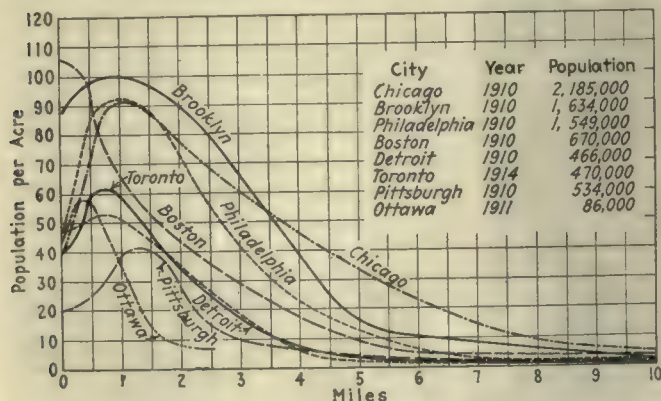


FIG. 3—CURVES SHOWING POPULATION DENSITIES OF VARIOUS CITIES

ber, 1891) has not affected the wages of our men. e are paying 16½ cents per hour, the same as before e reduction and 1½ cents more than the contract re- quirements in the city franchise. The hours are limited ten hours per day and sixty hours per week, and these ages are fully equal to 20 cents an hour in the States. "The total cost per car-mile run in the city of Toronto or the year 1894 was 8.33 cents, which included insur- ance, taxes, injuries, and damages, in addition to all operating expenses, not allowing, of course, for the 8 cent of gross receipts."

At the beginning of the company's franchise the only taxes it was called upon to pay, in addition to the per- centage on receipts and the pavement charge, were school taxes and the ordinary tax levied against the company's real estate, which were especially mentioned in the franchise. After several years, however, the city commenced to assess the company's rails, poles and wires. This assessment was protested by the company, but in 1897 the courts decided that the roads, poles and wires were real estate. At first the assessment was about \$1,000 per mile of track, which was termed "rap value," but in 1902 the assessment was increased to \$6,300 per mile.

In spite of these facts the enterprise, on the whole, was prosperous until the great increase in the cost of labor and materials due to the war began to make inroads into the earnings of the company. In 1913, the year before the war, the gross income was more than \$1,000,000 and represented an increase of 147 per cent during a decade, or an average of 14.7 per cent per year. In spite of the fact that 18 per cent of the gross earnings were being paid to the city under the agree- ment or in general taxes, the company showed a surplus after paying 8 per cent dividends of its stock and had no difficulty in issuing new stock at par to its stock- holders. Its average operating ratio for the ten years ended with 1913 was 54.85 per cent. By 1920, however, the company was paying 60 cents maximum to its motor- men and conductors, and while the gross earnings had increased to \$7,909,891, the net balance from operation

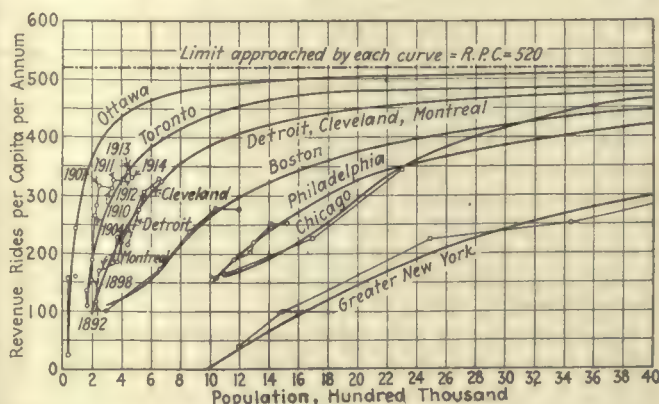


FIG. 5—CURVES SHOWING GROWTH OF RIDING HABIT IN VARIOUS CITIES

was only \$1,283,383, and the payment to the city amounted to \$1,559,868, or 121 per cent of the net balance. An accompanying table gives the financial and traffic data of the company.

STATISTICS OF TORONTO TRAFFIC

In 1915 the city authorized an extended inquiry into the transportation situation in and around Toronto in connection with the entrances into the city of the radial lines. The committee in charge of the inquiry consisted of R. C. Harris, Commissioner of Works; F. A. Gaby, chief engineer Hydro-Electric Power Commission of Ontario, and E. L. Cousins, chief engineer Toronto Harbor Commission. Among the conclusions reached by the committee was that the city should acquire the Toronto Railway at the expiration of the franchise in 1921, that a comprehensive program for street trans- portation development should be committed to a com- mission, consisting of representatives from the city, the Harbor Commission, and the Ontario Hydro-Electric Power Commission, and that a rapid transit system in the strict meaning of the term was not required at present in Toronto.

Many interesting data and charts were compiled

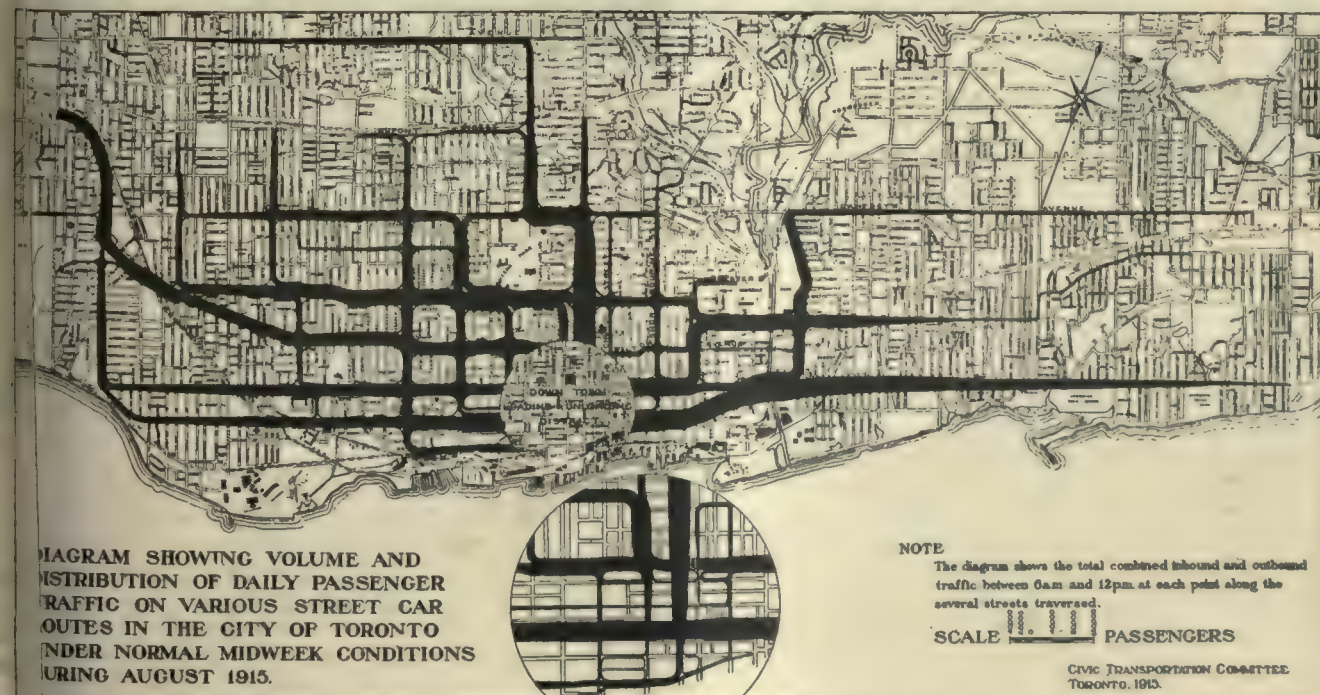


FIG. 6—DIAGRAM SHOWING VOLUME AND DISTRIBUTION OF STREET RAILWAY TRAFFIC IN TORONTO UNDER NORMAL MIDWEEK CONDITIONS DURING AUGUST, 1915

showing distribution of population and traffic. Although for the most part these data relate to 1915, some of the most interesting charts are reproduced in this article as the latest available.

Fig. 1 shows the distribution of population in 1914, each dot representing 100 people. In the report of the commission this chart was one of a series in which changes in the distribution of population over the previous period were distinguished by the color of the dot. In 1914 the population within the city was 470,100 and that adjacent to the city 31,400.

Fig. 2 shows the population per acre in Toronto at different periods and in zones from the civic center of

seems to be about 520. This theory has been followed in the chart reproduced.

Fig. 6 gives the approximate distribution of passenger traffic on various street railway routes in the city of Toronto under normal midweek conditions during August, 1915. The width of each route line is proportional to the combined inbound and outbound traffic between 6 a.m. and 12 p.m. at each point along the several streets traversed.

Fig. 7 shows by the colored area within the outside line the distribution of office and retail business district, heavy and light manufacturing and residential districts of Toronto, as estimated with a population of



FIG. 7—MAP SHOWING EXTENT AND CHARACTER OF OCCUPANCY OF THE AREA REQUIRED BY TORONTO WITH A POPULATION OF 1,500,000 PEOPLE

the city at the corner of Yonge and Queen Streets. The data given in this chart are predicated on the removal of the traffic barriers presented by the Humber River and the Don River. A similar chart (not shown) shows the same data in case these barriers are not broken. Fig. 3 shows the population per acre for Toronto as compared with other cities mentioned. Fig. 4 gives the percentage of annual increase in population of various cities. Fig. 5 gives the rides per capita in different cities, the curves for the higher populations being estimated. In its discussion of these estimates the commission points out that the so-called "law of squares," that is, that revenue rides increase as the square of the factor of the increase of population, can be applied only as an approximation to a city in its earlier periods of growth, and that the limit of rides per capita per annum under present transit conditions

1,500,000 people, assuming that the existing barrier presented by the rivers on each side of the city are broken by adequate means of transportation. In the map the municipal boundaries and built-up area of 1915 are shown within the outside line. The municipal boundaries of 1891 are also given.

CITY DECIDES TO PURCHASE PROPERTY

In August, 1920, the city notified the company that would take over the property at the expiration of the franchise on Sept. 1, 1921, and appointed a committee to negotiate the purchase, consisting of the Commissioner of Public Works, the Commissioner of Finance and the Corporation Counsel. Negotiations were begun and while the city began operation of the property on Sept. 1, 1921, the question of compensation has not been settled, as the wording of the clause upon the basis of

THE TORONTO RAILWAY COMPANY STATISTICAL STATEMENT FOR THE YEARS 1910 TO 1920

	1920	1919	1918	1917	1916	1915	1914	1913	1912	1911	1910
Gross income.....	\$7,909,891	\$7,234,895	\$6,526,302	\$6,291,759	\$5,973,161	\$5,694,136	\$6,127,096	\$6,049,018	\$5,448,050	\$4,851,541	\$4,377,116
Operating, maintenance and other charges.....	\$6,626,508	\$5,655,658	\$4,509,651	\$3,815,277	\$3,350,657	\$3,250,611	\$3,529,546	\$3,123,308	\$2,866,550	\$2,653,361	\$2,237,187
Net earnings.....	\$1,283,383	\$1,579,236	\$2,016,651	\$2,476,481	\$2,622,503	\$2,443,524	\$2,597,550	\$2,925,710	\$2,581,500	\$2,198,179	\$2,139,928
Passengers carried.....	197,346,726	182,377,494	166,510,326	158,087,984	149,529,754	142,061,258	152,966,153	151,236,925	135,786,573	120,997,844	109,415,264
Transfers.....	77,911,713	70,446,128	63,176,397	62,301,636	61,342,763	62,398,638	65,778,022	63,083,118	56,176,985	48,730,671	42,630,756
Percentage of charges etc., to passenger earnings.....	84.2	79.5	71.7	61.5	57	57.9	58.4	52.2	53.4	55.2	51.6

his compensation is capable of several interpretations and is now being considered by an arbitration board. This board consists of Major Hume Cronyn of London, Ontario, chairman; Sir Adam Beck for the city, and Sir Thomas White for the company. Hearings were begun on Sept. 13, 1921, and the company, after sixty-four sessions, completed its presentation of the case on Jan. 27. Adjournment was ordered until March 14, when the city was to commence the presentation of its side of the case. The testimony has been printed in abstract from time to time in the news columns of this paper commencing with the issue of Sept. 24, 1921.

MUNICIPAL OPERATING ORGANIZATION

The municipal operating organization is entirely separate from the committee appointed by the city to negotiate for the purchase of the property. It is known as the Transportation Commission and consists of P. W. Ellis, chairman; George Wright and R. R. Miller, commissioners with H. H. Couzens as general manager of the system. D. W. Harvey, who prior to the formation of the commission had charge of the Civic Railway Lines, is assistant manager; A. T. Spencer is engineer-in-charge, W. R. McRae is superintendent of rolling stock, W. Howden is superintendent of schedules, and J. McCulloch is traffic superintendent. Mr. Spencer came from Montreal, where he had long been associated with the Montreal Tramways Company, and the three officials last mentioned have been connected with the Toronto Railway. The act under which the Transportation Commission was appointed declares that the revenues from the property should pay the whole cost of the service.

This meant, of course, that the fares would have to be raised. The fares under company management remained as specified in the franchise. When the city took over the property the fares were raised to 7 cents cash with four tickets for 25 cents and fifty for \$3, with a cash fare of 15 cents between midnight and 6:30 a.m., and no workmen's tickets. Children are still carried at half rates.

A novel method is followed in determining whether a child is entitled to ride at half rates. The criterion is not the age but the height of the child. A mark is painted at the car entrance and near the fare box 51 inches above the car floor. Any child shorter than that height can travel at the reduced fare. If taller than

51 in. full fare must be paid. The position of the mark is such that the conductor can see at a glance as a child enters the car whether it is over or under this limit.

FINANCIAL ARRANGEMENT

To take care of immediate improvements and provide part of the purchase price for the company, the city in 1921 issued \$15,000,000 in serial thirty-year bonds, carrying interest at 6½ per cent. These bonds were sold to the public at about 102. One-third of this issue was sold in Canada, with principal and interest payable in Toronto, and two-thirds in the United States with principal and interest payable in either Toronto or New York, at the option of the holder. A sinking fund was established to begin in three years and to pay off entire bond issue in thirty years. The charges for sinking fund and interest amount to about \$1,200,000 per year. The tax rate of the city in 1921 was \$33 per thousand.

The budget of the commission for its 1921 program and covering both construction and rehabilitation was as follows:

Cars.....	\$4,400,000
Trackless trolleys and other buses.....	200,000
Carhouses and shops, including tracks in same.....	1,900,000
Tracks on streets.....	4,500,000
Total.....	\$11,000,000

One of the enlarged carhouses will have a storage capacity of 9,000 sq.ft., with eighteen tracks, and the other a storage capacity of 21,000 sq.ft. with twenty-six tracks.

The commission has extensive plans for improving the service in addition to physical improvements. One of these is to decrease the number of stops so as to increase the schedule speed, which, on the Toronto Railway, has averaged 8.84 m.p.h.

A careful traffic survey will also be conducted to determine whether there will be any gain in rerouting. Methods of ameliorating conditions during the rush hour will also receive especial attention. At present, it is estimated that 37 per cent of the business is done between 7:30 and 9 a.m. and 4:45 to 5:45 p.m. This is a 65 per cent increase since 1915, although the general traffic has increased only 35 per cent during those years. A traffic study department has been appointed to conduct special studies along these and similar lines.



ST. CLAIR AVENUE AT AVENUE ROAD, MAY, 1921, BEFORE LINE WAS TAKEN OVER, SHOWING QUEUE OF PASSENGERS TRANSFERRING BETWEEN TORONTO RAILWAY CARS AND CIVIC RAILWAY CARS. WITH THE CONSOLIDATION OF THE TWO SYSTEMS THIS CONDITION HAS BEEN ELIMINATED



EIGHTY-TON ELECTRIC LOCOMOTIVES IN SWITCHING SERVICE ON THE NEW YORK, NEW HAVEN & HARTFORD RAILROAD

Electric Switching Locomotive Results

Experience of the New York, New Haven & Hartford Railroad Is Cited to Demonstrate the Reliability and Serviceability of the Electric Machines in This Class of Service

BY F. W. CARTER

Railway Department, Westinghouse Electric & Manufacturing Company

IN THE report of the committee on heavy traction of the American Electric Railway Engineering Association, presented at the Atlantic City Convention last fall, considerable information regarding electric switching locomotives was given. The report included data of the sixteen New Haven switching locomotives, one of which was put into service in 1911 and fifteen in 1912. These locomotives have, therefore, been in use practically ten years. In view of the length of this service

and of the attention being given to electric locomotive switching by the men interested in electrification, some recent information will be of interest.

When the New Haven yards were electrified, every three electric locomotives replaced five steam locomotives which had been used for switching service. The sixteen locomotives in electric switching service weigh 80 tons each and are of the single-phase, 25-cycle, 11,000-volt type, having two articulated trucks suitable for the heavy strains to which locomotives are subjected in classification and yard work. The over-all length of these locomotives is approximately 37½ ft. They have a tractive effort of about 23,200 lb. with a horsepower rating of 752, and a maximum speed of 25 m.p.h. Each locomotive has four motors geared to the axles. The diameter of the driver is 63 in.

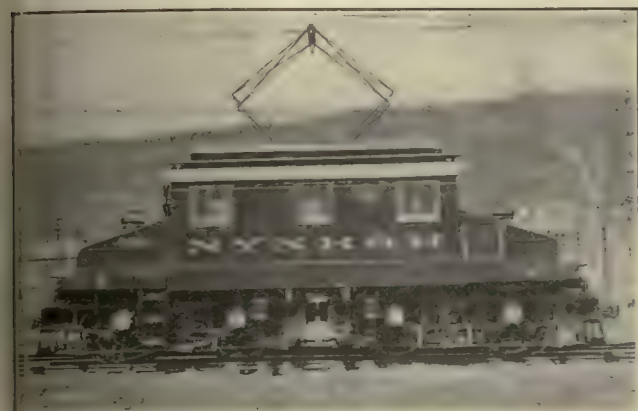
Five of these locomotives are located at the Oak Point yard, two at the Westchester yard, two at the Stamford yard and three at the Harlem River yard. One



CLASSIFICATION AND SWITCHING SERVICE IS EASY WORK FOR THESE LOCOMOTIVES, WHICH HAVE A TRACTIVE EFFORT OF 23,200 LB. AND A RATING OF 752 HP.

used for transfer of freight on the New York, Westchester & Boston Railway and the remaining three are held at the shops for inspection or use at whatever point the service demands.

The three main electrically equipped yards on the



TYPE OF SINGLE-PHASE, 25-CYCLE, 11,000-VOLT SWITCHING LOCOMOTIVE ON THE NEW HAVEN

New Haven are the Oak Point yard, having a track length of about 37 miles, with a total of 35.5 miles electrified; the Harlem River yard, with 23 miles, and the Westchester yard, with about the same trackage as the Harlem River yard.

ELECTRIC SWITCHING IN THE OAK POINT YARD

The number of electric switching locomotives assigned to the Oak Point yard varies at times from five to seven, according to the amount of traffic to be handled. The locomotives in this yard are used in two different classes of service, four of them being assigned to what is known as "float yard" service, to unload eastbound cars from the floats and to load westbound cars on floats, and also to do whatever switching is necessary with the westbound cars.

The New Haven road has approximately sixteen tugboats with capacities ranging from 350 to 1,200 hp. each for transporting the freight cars between the terminals by floats, the floats having a carrying capacity of from twelve to twenty-two cars each. The fifth locomotive used in these yards takes the eastbound cars from the float yard to the classification yard and makes up the eastbound trains. In looking over the records one month was selected as a representative month, which showed an average of forty-three floats handled daily at the Oak Point yard. Using an average tonnage of 900 for the eastbound float loads, and 600 for the westbound, the four locomotives assigned to the float yards would handle approximately 16,000 tons each in a twenty-four-hour service. The locomotive working in the classification yards handles about 75 per cent of the eastbound cars received, the other 25 per cent being taken to the Westchester yards by the transfer engines. This would make the average daily tonnage for these locomotives approximately 18,000. In addition to loading and unloading the floats the four locomotives in the float yard do a certain amount of switching of westbound cars and various miscellaneous work in the yards. The figure of 18,000 tons, therefore, seems to be a very fair average tonnage for the locomotives working in the yard.

The monthly mileage made by several of these locomotives in switching service is between 4,300 and 4,500. The locomotives are kept in service twenty-four hours

a day by using three eight-hour crew shifts, and after the completion of 2,500 miles they are sent to the Van Nest shops for a light inspection. A day force working eight hours is employed for locomotive inspection and the work is usually done at the rate of two locomotives per day.

A number of these electric locomotives have made records of twenty-four hours a day for thirty days without any interruption.

A French Experimental Gasoline Rail Car

The Tramway Company of the Department of Deux-Sèvres Has Recently Tried Out Successfully a Rail Bus Made from an Army Camion or Truck

IN THE Feb. 4 issue of *le Génie Civil*, G. Tartary gives recent information regarding the gasoline rail car which he described in an article several months earlier in *l'Industrie des Tramways, Chemins de Fer et Transports Publics Automobiles*. The sample car is now making 125 miles per day, at a normal speed of 19 to 22 m.p.h., and operating on grades up to 3.5 and 4 per cent.

This car is being used by the Compagnie des Tramways des Deux-Sèvres in France. It was built by the company with the chassis of an 18-hp. war-time motor truck as a basis. The following are the characteristics of the vehicle:

Length of chassis.....	15 ft. 9 in.
Length of body.....	13 ft. 11 in.
Width of body.....	5 ft. 5 in.
Height of body.....	5 ft. 11 in.
Horsepower.....	18 to 20
Seating capacity.....	16
Standing capacity.....	4 to 8
Weight, without load.....	4,410 lb.

The gasoline consumption under the conditions mentioned earlier is 1 gal. for about 12 miles.

The wheelbase is 10 ft. 6 in., which is too great to permit the rounding of ordinary curves with a rigid mounting of the wheels. The former mounting with steering wheel connection was, therefore, retained, but with the addition of a spring centering device to provide a restoring force always tending to bring the wheels



TINY RAIL BUS THAT HAS MADE GOOD IN FRANCE

back to a tangent-track position. The deflecting force in curved track is provided by the reaction of the wheel flanges on the rails. To insure a smooth transition into and out of curves the driver uses the usual steering wheel, which, however, is provided with an indicator to show him the position of the flanged wheels.

Illinois Associations Meet in Chicago

Advertising, Franchises, Car Design and Wood Preservation Occupy Attention of Electric Railway Men—Joint Sessions Held with the State Gas and Electric Associations

MEETING simultaneously with the Illinois Gas and Electric Associations, the Illinois Electric Railways Association held a convention in Chicago on March 15 and 16 with a good attendance. Joint meetings of the three associations were held both forenoons and a joint banquet on Wednesday evening. At the general session on the morning of March 15 John F. Gilchrist, Commonwealth Edison Company, Chicago, addressed the gathering on the need for co-operation on the part of the utility executives with the Illinois Committee on Public Utility Information, laying particular stress on the need for further work with the utility company employees in order that their far-reaching influence in the general program of informing the public may be secured. The splendid accomplishments of the Illinois Committee and how the utilities can co-operate with it to get the greatest good from its work was the subject of discussion by a number of utility men who followed Mr. Gilchrist.

The general session on Thursday morning was addressed by President Robert I. Todd of the American Electric Railway Association and R. B. Brown, vice-president American Gas Association. M. H. Aylesworth, executive secretary National Electric Light Association, spoke briefly of the recent investigations of the government-owned hydro-electric services in Canada and of the business promotion campaign which the association is about to undertake in a broad way.

W. L. Goodwin, assistant to the president Society for Electrical Development, was the only speaker at the evening banquet. B. J. Mullaney, People's Gas Light & Coke Company, Chicago, acted as toastmaster. Mr. Goodwin spoke of the need for more sales effort in the business of all of the utilities, laying particular stress upon the desirability of substantial advertising on a continuous sales basis and in far greater quantity. He pointed out that many merchandising businesses set aside from 5 to 10 per cent of their total revenue for advertising purposes, while the public utilities at present spend less than one-tenth of 1 per cent of their revenue for advertising. He referred to the drive for more and better business on the part of the N.E.L.A. and suggested a united drive of a similar nature on the part of all the public utilities.

ELECTRIC RAILWAY SESSIONS

At the first separate session of the electric railway association President W. L. Arnold, treasurer Elgin & Belvi-

dere Electric Company, Chicago, presided, while Second Vice-President R. A. Moore, general manager Aurora, Plainfield & Joliet Electric Railway, Joliet, Ill., presided the second afternoon. Following the paper by Mr. Moran on "Advertising the Electric Railway's Service," which appears elsewhere, the subject was discussed by Luke Grant, manager publicity department Chicago Elevated Railroads, and J. T. Downey, National Railway Advertising Company. Mr. Grant's remarks are given after the abstract of Mr. Moran's paper.

Referring to motion picture advertising for electric railways, Mr. Downey said that its value hinged upon the question of whether one should consider advertising in the nature of a food or a tonic. His thought was that as good as motion picture advertising is conceded to be (and it is the highest type of spectacular advertising), it is only tonic advertising. It can be used only at intervals. While a picture acts as a stimulant, every one knows a stimulant quickly wears off, and it is thus necessary to resort to more permanent advertising appeal. What is really most effective is a medium that will give the possibility of repetition, since selling depends upon the repeated telling of the advantages or value of what is to be sold.

Commenting on Mr. Grant's remarks that the most valuable medium of advertising is the satisfied customer, Mr. Downey said he agreed. But unassisted by advertising, a goodly measure of the value of the satisfied customer is lost because word-of-mouth advertising, while the best, is also the slowest. Therefore, in order to get the fullest measure of return from the satisfied customer, his good will should be capitalized in advertising.

The subject of electric railway franchises was then treated in a paper by Mr. Alschuler and discussed by D. E. Parsons, both paper and discussion appearing elsewhere.

"Traffic Relations between Steam and Electric Railways" was the subject of a paper presented by Richard Breckenridge, traffic manager Aurora, Elgin & Chicago Railroad, Chicago, Ill. In this paper Mr. Breckenridge reviewed the development of the electric railways, bringing out how their construction as competitors of existing steam lines was similar to the present paralleling of the electric lines by motor-bus lines, and how this development had led to an antagonistic feeling toward the electric railways which persisted to this day and prevented to a great extent full co-operation between steam and electric

railway companies. He stated various other reasons why interchange arrangements between steam and electric lines have not progressed much and how the electric lines are discriminated against, some of the inconsistencies of the relations, etc. He said that the electric lines seem to have made greater effort to effect freight, rather than passenger arrangements with the steam lines, while it would appear that the reverse should apply because of the preponderance of the passenger business of electric lines. He carried the view that probably the most effective way of commanding the respect of the steam lines was to originate passenger or freight business which would be attractive to the steam line as a joint proposition. He had not yet given up hope that some day the Illinois electric railways will have cars that may be interchanged not only among themselves, but with the steam roads as well.

C. E. Thompson presented a very able written discussion of Mr. Breckenridge's paper. It appears elsewhere in this issue.

A paper on wood preservation presented by Mr. Waterman of the Burlington Railroad contained some very interesting data on the results obtained and it appears elsewhere. This paper was discussed by Walter Buehler, the Barrett Company, New York. He said that some railway men were inclined to depreciate the value of data secured from test tracks. He thought such a test was good, except that the life shown in the test tracks may not hold exactly true as a basis of figuring over an entire system with the varying conditions that would then be involved. Commenting on Mr. Waterman's advocacy of treating of all bridge timbers, Mr. Buehler said that some claimed that this made the timber too inflammable, but that he had other equally good evidence that creosoted timber is less inflammable than untreated timber. One of the things to be considered is the design of bridges to make them less inflammable, such as by using ballasted track across the bridge, etc.

DISCUSSION ON ONE-MAN CAR DESIGN

Following the paper by Mr. Adams on safety-car design and the prepared discussion by Henry Cordell, both of which appear elsewhere, the general discussion of the subject brought out some very interesting ideas. J. R. Blackhall, general manager of the Chicago & Joliet Electric Railway, told how his company is starting to convert its entire city and suburban equipment for one-man operation. He considers the double-truck car to be superior for

one-man operation, for while admitting that there may be some current saving in using the single-truck car and certain other advantages, yet he felt that the advantages of the double-truck car more than outweigh these. In studying the platform equipment for one-man operation, Mr. Blackhall had been impressed with the unsightly appearance of the piping and devices and the inconvenience of its arrangement for the operator. In rebuilding the cars in Joliet, therefore, a special effort to avoid both of these points is being made. The controller is to be set in a hole in the platform so that it will be lowered 6 or 7 in., and a shelf put straight across the front of the car between corner posts and the controller and brake handle mounted on this. This gives the operator a chance to put his knees comfortably under the table with both operating levers at a convenient location and comfortable height. The controller handle is connected by chain and sprockets to the drum. All piping and conduit and other equipment is then concealed in a cabinet, with considerable improvement in the appearance. Mr. Blackhall expressed the thought that it may possibly develop that a remote-control will be more satisfactory than this drum control as it is to be arranged in these rebuilt cars, and the manufacturers are giving some consideration to the subject.

EFFECT OF LOCAL CONDITIONS ON SAFETY CAR DESIGN

M. B. Lambert, Westinghouse Electric & Manufacturing Company, in referring to the past experience of the operating men with light-weight equipment, said that the manufacturers had also had some excellent experience that would be very valuable in further development work. The argument of "local conditions" used by some electric railway men as the reason that they could not make use of the so-called standard safety car has been looked upon as inconsequential, but Mr. Lambert said we must now admit that there are local conditions that affect the trucks, the motors, the brakes, and everything about the car. The one-man car problem today is broadening as to whether 25 hp. or 35-hp. motors should be used, and whether two motors or four motors on double trucks. Where the use of the standard safety car has been greatly successful, this success has been one of merchandising rather than of operating economies, for there probably has been some high maintenance. It is possible, therefore, that a larger, four-motor, more substantially built one-man safety car will be better, for this will give better traction and better acceleration than can be had with a single truck and two motors. The car is primarily for the purpose of giving rapid service, and all features of the design should be directed toward that end.

Mr. Lambert then emphasized the great value of keeping performance records. He said that no other device

known to the electrical art has undergone more rapid development than the street-car motor. This development is costly and the industry has had to pay the cost that has resulted from the necessity to do too much of this development work without good information on which to base the development.

FURTHER FACTS REGARDING THE CHICAGO CAR

Mr. Adams then answered some of the points raised in the discussion. On the use of aluminum air piping, he said that this was being watched and studied very closely on the new Chicago Surface Lines car, and that he had serious question in his own mind whether it would be practicable. Step heights of the one-man cars are a very important item of the design, the steps on Chicago's newest car being 13 in., and 12 in. onto the platform and 6 in. onto the car floor. As to the use of a selective door control, making it possible to open either entrance or exit doors separately, or both doors simultaneously with the one brake valve handle, he said this would necessitate nine additional pipes on the platform. He had considered that this was a complication which was hardly warranted and had avoided it and at the same time obtained a partially selective control by the use of a separate handle just above the brake handle which makes it possible to open the exit door without regard to the position of the brake handle.

On this first double-truck one-man car four 25-hp. motors have been used, but there is likelihood that four 35-hp. motors or two 50-hp. motors on maximum traction trucks may be used on any future cars built. He said that the Chicago Surface Lines has 650 two-motor equipments in operation and that during the very severe winter of 1917-18 a large number of motors were lost. Many of the four-motor cars were running around during this period with only three motors in operation, and holding to schedules, but with the two-motor equipments, when one motor was down, the car had to be shopped. This was a very serious disadvantage for the two-motor equipment. The problem is one of cost, and if there is enough advantage in this respect in the two-motor equipment to offset this other disadvantage, they may be used on the safety cars in prospect.

SURFACE LINES' CAR DESIGN INDORSED

W. H. Sawyer, president East St. Louis & Suburban Railway, concluded the discussion on one-man cars by admonishing every railway man present not to leave the city until he had seen Mr. Adams' double-truck safety car with the separate entrance and exit and automatic doors at the exit. Mr. Sawyer has been one of the strong advocates of the standard car, and he said he had been out to see Mr. Adams' car and that nothing would have pleased him more than to have been able to find some flaw in this new design. But he had not been able to do it. The

small single-door single-truck car is all right for the small city, he said, but Mr. Adams' car can and will be used in so many places where the standard car can never be applied that it opens up an altogether new idea of the field of the one-man car.

BUS PROBLEM BRIEFLY DISCUSSED

In a general discussion of the use of motor buses, W. C. Sparks, Rockford & Interurban Railway, Rockford, Ill., told of the events leading up to the inauguration of bus service by his company. He said that when Camp Grant was closed the Fay Motor Bus Company had thirty to thirty-five buses on hand with no place to operate them, and finally succeeded in getting permission of the city to operate a competitive service with the street railway. The latter got an injunction immediately so that the bus operation never began, but in the final settlement of the matter with the city the traction company had to agree to buy some buses to serve certain territory not reached by the street railway—a newly-developed section of the city to which the street car lines had not been extended. Buses will be placed in operation within ten days to connect this district with the end of the car line, charging an 8-cent fare and issuing and receiving transfers between the bus and the cars. Mr. Sparks considered that these buses would not make any money, but if they kept competition out and broke even on expenses they would be well worth while. He also considered that it would be doubtful if this plan of operating the buses to connect with the end of the car line could be retained permanently, feeling that the buses would ultimately have to be operated all the way into the city, and that this would mean a duplication of service. For this special service, the trolley bus was not considered at all, because of the feeling that the proposition was likely to be temporary. The buses to be used are White chassis with body built by the Kuhlman Car Company and he said they were much finer than those used by the motor bus company.

J. C. Thirlwall, General Electric Company, contended that very few interurban bus companies are making any money. He said the only reason the buses in city service can show any profit is that they are not attempting to provide additional equipment to handle rush-hour service as the railways have to do. W. G. Brooks and M. B. Lambert, Westinghouse Electric & Manufacturing Company, expressed the general view that the main problem before electric railway men is to study the motor bus and determine where it can be used to advantage. The electric railway man is primarily a transportation man, and he should not shut his eyes to any new development that may fit in anywhere into his business of providing transportation. Mr. Lambert suggested that a committee be appointed to make a special study of the bus and report to the association.

Advertising the Electric Railway's Service*

The Well-Edited House Organ, Proper Newspaper Contact and Well-Informed Employees Are the Means of Creating Favorable Public Sentiment—
Moving Pictures in Which the Appeal Is Indirect Are
Valuable in Soliciting Patronage

By J. J. MORAN

Chicago, North Shore & Milwaukee Railroad, Chicago

IN CONSIDERING the question of advertising the electric railway industry, we might put the subject under two general headings, viz: publicity aimed at creating a friendly atmosphere and selling good will and advertising to induce travel and sell transportation service. The former is essential to all transportation lines, whether they serve a local community alone or whether they branch out into the interurban field, while the latter is more directly needed by the interurban lines. In discussing methods to be employed to obtain the object sought, we might, under our first heading, consider house organs, newspapers and employees.

The house organ, if properly edited, can tell the general problems of the property in a concrete way, which will be understood by the traveling public who are entirely unfamiliar with organization matters. Financial reports are usually puzzles to the uninitiated, and if they were brought down to a basis where the every-day individual could understand them, they could serve a very broad purpose. In addition to the financial condition of the property, the problems with which a company is confronted daily can be explained and the columns of the organ opened to patrons for suggestions or requests for information. Many people have ideas which they feel would help service but are reluctant to give them expression. Others are not so reluctant, and if the thoughts are passed on by those, others receive the benefit of the explanations given. Great care should be exercised to see that the information furnished is accurate and clear. If your readers come to a realization of the fact that the information received through this medium is dependable, it will go far toward creating confidence in the company as well as a spirit of good will toward it.

Our second subdivision is newspaper advertising. It is very essential that a representative of the property keep in constant touch with the newspaper office, especially in small cities, and that the editors of the paper are treated in such a way that they will know their suggestions and criticisms are properly received and acted upon. If this thought can be conveyed to the local press, any criticisms or suggestions in connection with service, which might be received by them, will be immediately taken up with the company representative and the subject discussed, so that the editor will be able, if necessary, to publish the company side of the controversy from the fact that he is in personal touch with the trans-

portation official, and it will have a tendency to make him look at the company's problems with sympathetic understanding.

The third subdivision is the employee. The employee is one of the best assets that a property can have for creating public sentiment in favor of the company, if care is taken to see that he is properly informed on the company's problems. Much depends upon the supervisory force as to the success of this work. From time to time executives in all organizations discuss problems with their department heads, feeling that in these discussions they are doing all that is necessary; but they fail to see what view the next group of their employees may take on the same problems. It is just as necessary to have trainmasters, supervisors and clerks thoroughly educated on problems of the industry as it is for executives and officers themselves to be thus informed. These men in turn are in touch with the employees who come in direct contact with the public, and can disseminate this information to the ranks and in that way pass it on to the public. Therefore, instead of having one publicity man in the organization, you immediately increase that department so that every employee becomes a member thereof. The minute a trainman hears a discussion on an affair of the company, he will break in and give the persons present the benefit of his knowledge. The majority of residents in a community are not in possession of facts and figures, and the moment an employee undertakes to explain conditions to them, quoting facts, that minute the talk changes, for the reason that the individual making the criticism usually is at a serious disadvantage. These facts are brought into the homes by the employees and into various organizations to which they belong, with the result that the truth on the situation is finally carried in a forceful way to the attention of every resident in the community.

If this is successfully done, it will have a strong tendency to iron out many of the present-day troubles of transportation companies and ill-feeling on part of the public; and will force the issue out of the political field. The politician has been using the public service companies as a football for a great many years, but he will cease his attacks in this direction as soon as he finds that public sentiment is leaning the other way. The removal of this question from politics is one of the most needed things of the present day.

In connection with advertising for patronage, it is very questionable if much can be accomplished in that direction in the local transportation field. If a person has to go to a certain

point in a city, he will take the public service line to reach that point, but if he has no occasion to go there it is very doubtful whether or not the best worded advertisement could induce him to go.

On interurban lines, however, advertising is very essential for the reason that there is usually competition and the property which shows the better degree of service at the greatest savings in both time and money naturally gets the business. For this purpose, billboard, car card and moving picture advertising can be used to good advantage. Three of the above methods have been tried out for years and have proved effective, so that it is hardly necessary to discuss them in detail, but the last named is not so well known.

In considering moving picture advertising, two things are essential: There should be a story which will interest the audience, and a proper method of distribution. In the early days of moving pictures, almost anything could be shown on the screen, but as the industry improved it became more and more difficult to secure space in the various theaters. At present it is almost impossible to secure the consent of a moving picture house to display any type of advertising. Where a patron pays his money to see a show, he naturally resents having his time taken up in reading advertisements. He can see these in the streets or in street cars without paying a premium; therefore indirect advertising must be used. The first step is to make a study of what your property has for sale; second, there must be an interesting scenario around which you can build up a story of your service, and one that will create the desire for travel without directly appealing to the audience; third, there should be a good camera man, and fourth, a reliable distributing agency to handle distribution of the picture.

This method of advertising was tried out on the North Shore Line two years ago and has proved very successful. The story starts in the early days of Chicago's history, showing Fort Dearborn, the old Kinzie House and the Indians in their native garb, traveling on the old Green Bay trail, running from Chicago along the lake shore and through north shore towns to Milwaukee and Green Bay. This old trail is paralleled by the North Shore Line. The picture then changes from the Indian scene to the present central district of Chicago, showing the present-day method of travel compared to the Indian in the former scene.

The picture simply shows a train pulling into the station at Adams Street and Wabash Avenue and passengers getting aboard. The name of the road is not brought out in any way to indicate advertising. The various steps of the Indians' journey are then taken up—each step contrasted with the present-day electric method of travel, and gradually a travelogue is served by the line. Finishing in Milwaukee, the picture shows the train pulling into the North Shore station. The name of

*Abstract of paper read at meeting of Illinois Electric Railways Association, Chicago, March 15-16, 1922.

the road is strongly brought out on the side of each car as the train slowly passes the machine. The accommodations at Milwaukee terminal are then shown, followed by a travelogue of the city of Milwaukee. The most interesting feature in each community is emphasized in this picture, and only at rare intervals is the road itself shown; so that unless a person was thoroughly familiar with the district, the film could not be connected with this property until the final scene. By this time the thought of travel has been planted and the desired result obtained.

This reel was shown in more than 300 theaters in Chicago, in all of the motion picture houses in towns between Chicago and Milwaukee, in more than 50 theaters in Milwaukee, and in choice locations as far south as Gary, west to Aurora and Elgin, and north to Watertown, Sheboygan and Madison, Wis.

Before showings were made in the various towns served by the North Shore, notices were sent to the newspapers calling attention to the fact that the picture would be shown, with the result that residents in the vicinity of the theaters immediately made arrangements to see their own community in moving pictures. The story which I heard all along the line was that the majority of moving pictures in the present day show wonderful scenes in New York and San Francisco, but "we never have an opportunity of viewing our home towns."

In addition to theater display, the picture was shown at the Pageant of Progress in Chicago, at county fairs, expositions and to numerous commercial associations, church organizations and in private clubs. Even some of the schools solicited its use for educational purpose. Numerous incidents have proved that it actually secured business. At the Pageant of Progress Exposition, a tourist party stopped, saw the film and changed their plans and chartered a train for Milwaukee and return. At an exposition in Milwaukee a society had almost closed arrangements to travel to Chicago over another route when some of their members saw the film, communicated with the committee in charge of arrangements and prevailed upon them to change the plan. You can readily see that owing to the fact that pictures tell your story in a way which registers quickly and clearly, and tell about your service in a way that is not offensive, good results will follow.

"Give Service that Will Sell Itself"*

BY LUKE GRANT

Manager Publicity Department, Chicago Elevated Railroads

IN DISCUSSING some of the methods of advertising the electric railway industry, Mr. Moran appears to have directed his comments more to publicity

men than to executives. I shall direct my remarks to operating officials. I believe they, in large measure, are the men who are responsible for whatever success the publicity man attains.

While railway officials have come to recognize the public's interest in railway operation and are anxious to take the people into their confidence, the public is not yet fully "sold" on the proposition. The big problem, therefore, in advertising the electric railway industry is to convince the public that the railway executives have seen the light.

How can this best be done? Mr. Moran has pointed out a few of the methods to be employed, but the effectiveness of any of them depends upon one method, which I will give you in a sentence—*Give service that will sell itself.* Get the public talking about the good service, instead of the poor service, and the publicity man and the advertising man will have a smoother road to travel and their work will be more effective.

I realize that I have set the operating men a big task. Most of you no doubt will say that you are now giving excellent service, and, measured by past standards, that undoubtedly is true. But the public has set new standards, and there is always danger that the men who are actually operating railroads are too close to the job to get the right perspective. The man poring over schedules and car mileage in his office is apt to have a different view of the service from the man who hangs on a strap.

It is the business of the publicity man, as I understand it, to try to place himself in the position of the strap-hanger and from that position endeavor to gauge public sentiment. That is why I am talking frankly to the operating men, because I am not quite sure that everything possible is being done to

give the kind of service that the public demands, and I realize how futile publicity and advertising are when they are not backed up by good service.

The best kind of advertising that a company can get is to have its patrons talk of the good service. That can be done. It is being done to my positive knowledge. On one of the roads with which I am connected, it is the most valuable advertising that we get. A man who has taken a trip over the line tells an acquaintance of the good, convenient service. The acquaintance tries it on his next trip. He has already formed a favorable impression from what his friend said of the service. He finds it comes up to his anticipations and becomes a regular customer. I have received scores—yes hundreds—of letters from passengers who got acquainted with the service in just that way. The effect of such advertising is cumulative. Every customer becomes a salesman for the service and the company gets the most valuable kind of advertising without the expenditure of a dollar, except, of course, the cost of giving service that sells itself. The spoken word is always more effective than the written word.

I do not wish to create the impression that if good service is given, there is no need for the publicity man. Good service will make his work more effective, but there is a place for him in every organization. If you are giving good service, let the public know about it. Encourage customers to talk about it. The point I have endeavored to make is, that when the publicity man writes something about the good service a company is giving, the executives should see that the service really is good. That is the way to make advertising effective. The public will not be "sold" on untruthful advertising. It demands real service and will not accept word pictures as a substitute.

The Modern Electric Railway Franchise*

To Provide by Ordinance the Rate of Fare Is Injurious to the Public in the Last Analysis—Local Ordinances Should Include Provisions Peculiar to Each City, While Rates and Service Should Be Within the Commission's Power

BY BENJAMIN P. ALSCHULER

Alschuler, Putnam & Flannigan, Attorneys at Law, Aurora, Ill.

APPROACHING this subject in line with the most progressive thought of the times, I might say that there is no such thing as a modern electric railway franchise granted by a municipality. This is particularly true in those states which have been most progressive with respect to the regulation of utility companies. In Wisconsin, for example, the right to use city streets is now granted by the state regulatory body under so-called indeterminate franchises. But unfortunately for the public and the street railways in Illinois, legislation has not advanced in our state as it has in some other states. We still have to deal with our local

councils and boards of trustees when it comes to the granting and securing of rights to operate street and interurban railways in streets.

In former days when ordinances were passed, it was the custom to write into them all manner of provisions, having to do principally with the compensation to be paid for the use of streets, with the imposition of burdens for paying for pavements, sprinkling, cleaning streets, for making annual payments into the city treasury, etc., and what was then looked upon as one of the most important provisions was with relation to the rate of fare that might be charged. In that particular most street railway ordinances were uniform in that fares were fixed at 5 cents.

Street railway companies in Illinois

*Discussion of paper, "Advertising the Electric Railway's Service," presented before the Illinois Electric Railways Association, Chicago, March 15-16, 1922.

*Abstract of paper read at meeting of Illinois Electric Railways Association, Chicago, March 15-16, 1922.

have had to carry on litigation with municipalities to have 5-cent fare provisions set aside. True, the law is no different today than it was twenty years ago with respect to the effect of ordinance provisions fixing rates, but unfortunately a large proportion of human kind do not want to believe the truth if it does not agree with its ideas as to what the truth ought to be. As far back as 1899 an ordinance provision fixing a rate was held by the Supreme Court of Illinois not to bind subsequent City Councils; in other words, it was held that a Council had no power to make a contract fixing the price for all future time, and the Supreme Court then said:

What might be proper for a city this year might not be proper the next year. It is impossible to determine with absolute or even tolerable certainty what changes a few years might work in the character and reasonableness of rates. No contract is reasonable by which the governing authority abdicates any of its legislative powers and precludes itself from meeting in a proper way emergencies or occasions that may arise.

This statement affirmed by the United States Supreme Court in 1899, fifteen years before our public utilities law went into effect in this state, has not served to educate the public generally, nor has it served to prevent unreasonable and unwarranted litigation on the part of public officials, and even now, although the Supreme Court since the adoption of the utilities law, has reiterated the statement made back in 1899 by such language as was used in the Quincy case: "The municipal authorities of this state have never been clothed with power to fix by binding contract rates for any definite term of years." When it comes to making application for new ordinances in municipalities we are always met with the demands of city officials that we make provision relative to rates.

No fixed and invariable fare can be reasonable because conditions change. We know that a utility charged with a public duty is entitled to earn a fair rate of return upon property used and useful, devoted to the public use; and with varying conditions as to costs of operation and maintenance, the fare must vary to bring that rate of return to the company and so that the public may be served at a price that conforms to the variation in costs.

There is no question but that the public is primarily interested in service. True, a large proportion of the people do not know this. An extra penny is not of nearly as much importance to an individual as safety, cleanliness and adequacy of service. If it be properly brought home to the individual he will appreciate the truth of this statement, but when it comes to negotiating for ordinances the apparent paramount thought of the municipal official in far too many instances is the rate of fare, service being but a secondary consideration, if any consideration whatever be given to it.

But people are becoming educated to

these things and it is only to be regretted that the campaign of education which our utility associations have been carrying on so well during the past three or four years was not begun twenty years ago.

Since Jan. 1, 1914, we have had in Illinois a regulatory law which by implication is written into every ordinance. It has superseded all the regulatory provisions of the existing ordinances. And any new ordinances that may be passed, if they contain any regulatory provisions as to such, must give way to the superior authority of the state as expressed in the Illinois utility law. In other words, to include in any ordinance today any provision, other than the statutory provisions, relative to what fares shall be, now or hereafter, is but a futile endeavor. We of course will meet with the political municipal official who seeks to curry favor with the public or to profit at public expense who will endeavor to include regulatory provisions in an ordinance and who must know, if he is properly advised, that any regulatory or police provision as expressed in an ordinance is contrary to our statutes.

It has been, as I might say, my misfortune to be placed in a position where I have had to negotiate street and interurban railway ordinances in the past few months. In this work I have been acting under the orders of United States Judge Evan A. Evans in a receivership proceeding. Following a suggestion made by the judge before an assemblage of leading and representative citizens of communities served by the particular company in his court room in Chicago a committee representing the different municipalities was appointed, and I have been negotiating with this committee ever since. The principal point at issue seems to be the inclusion of a fare provision in ordinances, to which of course I cannot agree because our law does not permit it, and were I to agree to it, it would be merely the procuring of ordinances under false pretenses.

People are learning more and more every day that the regulation of utilities, including the fixing of fares, is in the hands of the state; they are learning more and more every day of the problems of utilities and also that if they are to have service the utilities must be permitted to earn their way. Of course, in years gone by it was looked upon almost as rank heresy for utility companies to take the public into their confidence, but with practically no exception the utility operators have come to see the light and now appreciate the wisdom of publicity. This publicity will in time educate the public to a point where it will learn that the street railways and other utilities are but associations of people who have invested their money in a common enterprise for the purpose of serving the public and to earn a fair return upon the money which they have been willing to risk. If they are to render an efficient service they must be permitted to earn that fair return.

We have read considerable in the public print and in our railway journals of the Des Moines situation and of the Des Moines ordinance, which is somewhat different from the stereotyped service-at-cost franchise in that the valuation of the property for rate making purposes is not mentioned. This ordinance appeals to me as one which, if it could be adopted in Illinois, would undermine opposition in that its fairness is so apparent upon its face; in other words, it states that certain returns should be permitted to be earned upon outstanding bonds and funded debt, the amount of which was agreed to. It has a sliding scale of rates and with the primary rate in effect the company is not permitted to earn any return on its common stock, but as rates are reduced earnings may be set aside on common stock, increasing as the rates drop. Such an ordinance is one that will appeal to the public, but in practical effect we have such an ordinance in every city in the State of Illinois today. True, our commission fixes rates upon valuation, but the value of the Des Moines property was considered when agreement was made as to the amount of funded debt upon which the company should be permitted to earn return.

The public today is better educated than it was in the past with respect to the fallacy of payments made by companies for pavement, for licenses, etc. It is becoming educated to the fact that such payments must in the last analysis be made by the car riders. It is beginning to realize that such expenditures in no way serve to improve service and are nothing more nor less than a dead weight which the company must carry and that with such expenditures eliminated from ordinance provisions a corresponding reduction will be reflected in the rate of fare. But I say the public is just beginning to realize. It must also be made to realize that, in the last analysis, expenses of companies in litigation with municipalities must be borne by the car riders.

It is a rather anomalous situation, however, for a city to have the right to state whether or not a company may operate on its streets and then have all manner of regulations left with a state regulatory body. The wisdom of statewide regulation has been demonstrated to the satisfaction of practically all students of the question. It is the theory of regulation that utility operation shall be a monopoly and that it is within the power of a commission to require satisfactory service at reasonable rates. Who the operator may be or who may compose the company is of small moment to the community served so long as adequate service is rendered at a reasonable rate.

The length of time for which a given company may serve a community is of no real concern either to the community or its government, except that they should be concerned to the extent that they shall be adequately served for all time, or at least until progress in

the art may require different methods of operation. Such being the case, there is no good reason why a local council should prescribe who may or who may not operate a given utility, nor should it prescribe the length of time for which it may operate. A regulatory body with all the facilities at its command is in far better position to judge as to who should or should not serve the public. It can judge of the policies of the operators and of their financial ability to provide service. The indeterminate permit granted, as for example in Wisconsin, by a state body, would seem to be the answer and look for the day not far distant when through the co-operation of our committee on public utility information, the people themselves will advocate and favor such system in Illinois.

IMPLICITY SHOULD BE THE CHARACTERISTIC OF A FRANCHISE

The modern electric railway franchise, limited to conditions and laws as they today exist in Illinois, after all is but a short, concise and simple proposition. It should be nothing more or less than a grant of authority by a municipal legislative body to a company to operate its railway. To charge for the use of the streets is but another way of increasing rates of fare to the car rider for the benefit of the taxpayer. To make a company pay for pavement which it does not use is but another way of reducing the cost of pavement to the property owner whose property is benefited because the railroad is located on his street. To require a company to pay for sprinkling and cleaning streets is but another tax upon the car rider for the benefit of the property owner. All these items, paid for by the car rider, simply serve to keep rates up; they contribute nothing to the successful rendition of service and they must be eliminated from franchises. To provide by ordinance for a rate of fare serves only to cause trouble and litigation. If such provision could be made effective it could but serve to injure the public in the long analysis, because if the rate agreed upon is too high the public would be paying too much for a ride, and if it is made too low, then service would of course be correspondingly curtailed.

With the inclusion of proper provisions for conditions peculiarly local, an ordinance which would be entirely free from political bunk and which would in fact be the only ordinance that would be in conformity with the law, could be written somewhat in this fashion:

"Right, permission and authority are given to ——— Company to lay down and maintain its railway tracks and to operate its cars thereon, together with the right to construct, maintain and operate its lines of poles and wires in connection therewith for the operation of a street railway system upon the following streets (naming them) in the City of ——— for the period of twenty years from and after the date of the passage of this ordinance."

Discussion on Franchise Paper

By D. E. PARSONS
General Manager
East St. Louis & Suburban Railway

IN ILLINOIS electric railways are regulated as to service and fares charged for service. Conditions of the past few years in our industry have been such that it has given those who are interested in the street railway business considerable anxiety as to what the railways should have in reference to regulation, both city and state, in order to perform a service that will be satisfactory to the patrons of the utilities.

In his paper, Mr. Alschuler has mentioned a few types of franchises that are being tried, but the "indeterminate" franchise, most of us agree, is the most desirable for the proper rehabilitation of street railway financing. Such a permit, of course, should be exclusive, it should allow the fare to be flexible, it should insure against competition which parallels, it should permit not only ample regulation but regulation which will not confiscate, and regulation that is flexible enough to give a fair return on a fair value of the property at all times.

Most of the public utility operators find that the old franchises are as a rule worthless and destructive, consequently those financially interested and those in direct charge of operation have found it necessary and urgent that the railway companies immediately start an aggressive publicity campaign, with the object of presenting a correct and

honest viewpoint to the minds of the public, the press, and the city and state officials.

History tells us that the American people are not unfair on any problem if they understand, and if they are not improperly influenced in the wrong direction.

I have recently read an editorial in the *Railway Age*, under the subject: "Why Not Sell Necessary Service at a Profit?" The editor makes the following assertion: "We have said that the public fixes the prices it will pay. Here is a fact of vital importance which is constantly overlooked by many managements. The railways, collectively and individually, are well organized and equipped to present their cases to lawmakers, commissions and courts. In other words, they are well organized and equipped to 'sell' the lawmakers, commissions and courts. It is a well-known fact, however, that over and over again they convince lawmakers, commissions and courts that certain policies should be adopted, and that in spite of this, directly contrary policies are adopted. Why? Because the lawmakers, commissions and courts have been 'sold' the policies in question, but the public has not been, and it is public sentiment that finally determines the policies actually adopted."

In conclusion, the instrument that controls the destiny of a public utility, whether municipal or state, must take into consideration that in the long run it is to the best interest of the public to have its utilities operating efficiently year by year with a fair return to the investor.

Traffic Relations Between Steam and Electric Lines Improve*

Ill Feeling of Past Is Disappearing with Desire of Both to Improve Service—
Electric Lines Have Created New Traffic, Relieved Steam Lines of Short Haul Unprofitable to Them and Are Natural Feeders of the Trunk Lines

By C. E. THOMPSON
Assistant to President Chicago, North Shore
& Milwaukee Railroad, Highland, Ill.

THE prejudice which has so long prevented traffic relations between electric and steam railroads is a matter which every electric railway man should now appreciate, as many of the conditions which bring about the ill feelings of the steam road men for the electric road are now experienced by the electric railway in the competition of the jitney, the motor bus and the motor truck.

Not all the blame should be laid at the doors of the electric railways either, for, had the steam roads recognized that electric railways were a natural development and taken steps to use them as feeders rather than as competitors, the situation would be very different today. The electric railways, and the steam roads, also, should recognize that the motor car and motor truck are

natural developments; that they have a field of usefulness and should take steps promptly to use them as allies to gather traffic in out-of-the-way places and deliver it to the rail carriers.

I believe the ill feeling of the past is fast disappearing. Many of the large steam railway systems have electrified terminals in large cities, some have entire divisions operated by electric power and others are operating the electric railways in their territory as part of their system.

When the steam roads were loaded to the breaking point during the World War, the electric lines demonstrated their ability to handle large volumes of traffic and made a place for themselves as a part of the transportation system of this country. In the transportation act of 1920, Congress recognized the electric railways, and while they rightfully exempt them from many of the provisions of the act, the law provides

*Abstract of paper read at meeting of Illinois Electric Railways Association, Chicago, March 15-16, 1922.

that through routes and through rates and divisions shall be established between all carriers subject to the transportation act and vests the Interstate Commerce Commission with the power to establish through routes and joint rates between carriers without regard for the kind of motive power used. In case the carriers cannot agree as to the division of joint rates, the commission has the power to fix the proportion that each company shall receive.

With the better understanding that now exists, the demonstrated ability of the electric roads to perform as efficiently as the steam roads, with the disposition to deal fairly and openly, with the regulatory agencies definitely instructed by law, and the desire on the part of both the steam and electric roads to give the best possible service to the public, there seems to be no serious obstacle in the way of establishing the same traffic relations between electric and steam roads as now exist among the steam roads.

If such relations are desirable I believe the American Electric Railway Association, the various state associations and the individual companies should make a united effort to bring about full recognition by the steam railways. When the facts are presented showing the enormous volume of business now handled by electric lines, what a factor they have been in the building up of communities, how they have created a riding habit among the people, how they have relieved the trunk lines of the unprofitable short-haul business, and have been and can more and more be used as the creators of traffic and the natural feeders of the steam roads, and how the best interests of the public can be secured by full traffic relations, the desired results will readily be obtained.

The big question, however, is to what extent are interchange arrangements desirable? Most electric railway traffic men think that if they could become parties to all the joint tariffs applying in their territory, their problems would be solved and that greatly increased traffic would move via their line.

In order to discuss this question intelligently, we must divide it into two natural divisions—passenger traffic and freight traffic.

PASSENGER TRAFFIC

Passenger rates are based on the distance traveled, the same amount being charged for the last 5 miles as for the first 5 miles of a journey. Generally speaking, the rates are the same on all lines, both steam and electric, in a given territory. The only exceptions should be those necessary to establish the proper differentials to offset the difference in the character of the service rendered. The only benefit to the public through joint fares is that of service. Time and inconvenience are saved by purchasing a ticket and checking baggage to destination, and where through routing of cars or trains is arranged for, the elimination of the transfer adds to the comfort and pleasure of the passenger. Joint passenger

and baggage rates with steam roads are desirable and should be readily obtained. Before an aggressive effort is made along this line, however, it would be well for the electric lines of this territory to get together and put into effect joint passenger and baggage rates among themselves.

FREIGHT TRAFFIC

Freight rates are computed on an entirely different basis from passenger rates. While the length of haul is one of the elements considered, the classification of the articles is the chief element and the rate becomes proportionately lower as the distance becomes greater. The consideration of freight traffic naturally suggests a division of the subject as between carload freight and less than carload freight or merchandise shipments.

Carload Freight.—Most of the electric roads have physical connections with steam roads and interchange business at these junction points. In the absence of through rates, the local rates of the connecting lines are combined. The sum of these local rates being more than the through rate, the industry located on the electric line is discriminated against or the tonnage diverted from the electric line. Through routes and joint rates will, without a doubt, add a substantial volume of traffic and be of great advantage to shippers on or near the electric lines, and through routes and joint rates can, as I have pointed out, be obtained. Whether or not interline shipments can be handled on a basis that the revenue will pay all the costs of the service, including a fair return on the necessary investment, depends largely on the division of the through rates. The division allowed the so-called short-line railroads is such that most of them are in very bad financial condition. I know of no electric road having joint rates which keeps the cost of its freight service on

a basis that it can tell whether the handling of through carload shipments is at a profit or at a loss. It is my opinion that most of this interline business is handled at a loss by the electric lines as well as by the short-line railroads. These are times when each department of a business should be self-supporting. A very exhaustive study should be made as to the probable financial results before arrangements are made for participation in all the tariffs published for the carriers.

Merchandise Freight.—Contrary to the general opinion, I think the I. C. C. or merchandise freight offers the greatest opportunity for the electric lines. Many lines are now engaged in this branch of the business with considerable success. Through rates between electric lines, and between electric lines and the steam roads, will do much to increase the popularity of this business. The principal difficulties are the lack of proper terminals in the larger cities and the cost of handling at stations. Both problems can be solved by co-operation between the carriers. Joint use of terminals will aid greatly. The use of containers will, I believe, solve the excessive cost of handling at stations and the transfer between terminals.

There have been a number of successful experiments in the use of various forms of container. A container will be designed that can be handled on motor trucks, on electric railway cars in city streets, on standard steam-road flat cars, on river barges or on ocean-going vessels, which can be filled at the factory door, handled by motor truck to the nearest station, transferred, if need be, from one terminal station to another by truck and finally delivered at destination with the least possible cost of handling. Here again the electric lines should work out interchange arrangements, first among themselves and then through concerted action with connecting steam lines.

Recent Developments in Car Design*

Premature Standards Which Will Hinder Progress Must Be Avoided, but Certain Group Dimensions Should Be Established—The Automatic Treadle-Operated Exit Door of New Double-Door Chicago Safety Car Is Described

BY H. H. ADAMS

Superintendent of Shops and Equipment,
Chicago Surface Lines

THE development of the safety car has resulted in the rapid introduction of these single-truck units on a large number of properties. This widespread use of the car has been due primarily to the fact that their use makes possible a very substantial reduction in operating expenses and at the same time enables a more frequent service to be offered to the public.

The success of the car in meeting these requirements, and its consequent rapid introduction, has led some manufacturers and railway men to consider the construction as a final development,

and it has been widely referred to as a "standard" car. Although operating experience in a number of places has suggested some very desirable improvements, a considerable sentiment has existed against making any changes from the original design.

None of us will question the desirability of working toward standards in car construction as rapidly as the development of the industry and conditions permit. Care must be taken, however, to avoid the establishment of premature standards which will interfere with progress. Before a body construction can be considered as a standard for a particular type of service, it must represent, in the opinion of the

*Abstract of paper read at meeting of Illinois Electric Railways Association, Chicago, March 15-16, 1922.

dustry, the highest development, combining the factors of strength, weight, cost of construction and appearance. It must also represent the most effective and efficient arrangement for the safe, comfortable and rapid transportation of passengers. It is, in the writer's opinion, impossible to obtain in any single design of car, for service under all operating conditions on various properties in different parts of the country, the best combination of the above requirements. This problem may be met in the future by several types of cars, each designed for certain classes of service. Considering the subject on the basis outlined, I feel sure that there are very few of us who believe that we have reached a stage in any particular type of car now in operation where we are justified to stop and establish a standard. Every season shows long steps forward in the construction of light-weight cars. We are just beginning to see the possibilities of the future. The electric companies and the truck manufacturers are also apparently alive to the needs of the day. In car building the use of higher grade, lighter-weight materials is just commencing. Development of non-corrosive steel has recently made some long strides. This in itself opens up to car designers unimagined possibilities in reduction of weight and cost of construction. The application of lighter and better materials will and must affect the design of car bodies. Methods of handling heavy passenger traffic in more and more efficient ways are constantly being developed.

This does not mean that progress cannot be made toward standardization. Immediate progress of this nature can be made along the lines of certain group dimensions, fixing post centers, car widths, roof types, etc., into certain groups to be applied to meet the varying conditions on different properties.

Turning to the question of the one-man safety car, we in Chicago, although recognizing the great service which this car has rendered the electric railway industry by the successful establishment of certain principles of operation, have found after a period of experience under actual operating conditions on certain of our lines that this unit has certain inherent limitations. The most impor-



THE 37-FT., 45-PASSENGER DOUBLE-TRUCK ONE-MAN CAR NOW BEING TESTED BY THE CHICAGO SURFACE LINES

tant of these limitations are: (1) Excessive time for passenger interchange, due to single doorway, permitting only one stream of passengers to alight from or board the car; (2) congestion within the body, due to narrow aisle and restricted space for movement of passengers at the front end; and (3) excessive damage resulting from comparatively light collisions.

With these factors in mind we prepared a design which would more nearly meet our requirements, and our first efforts were along the lines of a single-truck unit. This car was made 8 ft. wide, 29 ft. 4½ in. in length over bumpers, and weighed, completely equipped, 16,375 lb. It is illustrated and described in the ELECTRIC RAILWAY JOURNAL of Jan. 14, 1922.

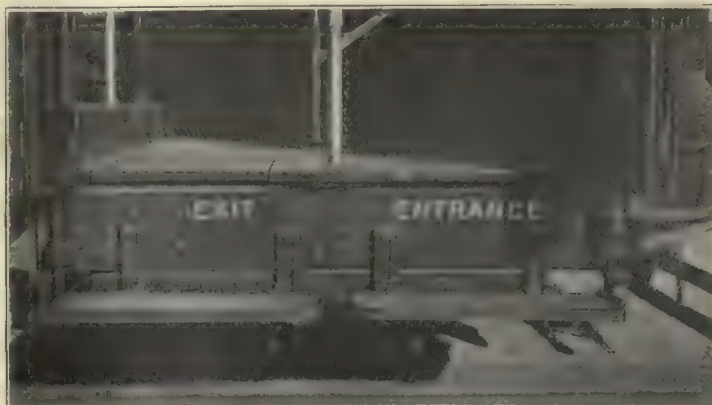
In the design of a car for city service, provision should be made for the efficient loading and unloading of passengers during maximum load conditions. Where schedule speed is of any importance, loading and unloading of passengers should be accomplished in the minimum time possible. The use of a single entrance for the interchange of boarding and alighting passengers is not in accordance with this principle of good railroading.

Our sample single-truck car was therefore provided with a double passageway at each end. The exit pas-

sageway is protected by means of a barrier, which is latched in a closed position. This barrier is released by a passenger stepping on a treadle in the exit passageway on the platform, thus permitting the gate to be pushed outward. After the passenger has alighted, the gate returns automatically to the latched position. This barrier was installed with an idea of educating the public to enter via the entrance passage and leave through the exit.

This car was completed and placed in service the early part of September, 1921, and has been in successful operation on outlying lines since that time. From observations of its operation, we decided that a double-truck car would give a more flexible unit and would more satisfactorily meet the service requirements on similar lines in Chicago. We attempted to work out a combination which would have the advantages of small, light-weight units, with which a frequent economical service could be rendered during periods of light travel, and which at the same time would take care of the heavier requirements of rush-period conditions.

The double-truck car, which is also illustrated and described in the Jan. 14 ELECTRIC RAILWAY JOURNAL, was made 8 ft. 6 in. in width, 37 ft. 2 in. in length over bumpers, and was provided with a double passageway at each end,



LEFT—IN COLD WEATHER PASSENGERS CAN LEAVE CAR WHERE THERE IS NO ONE TO GET ON WITHOUT HAVING BOTH DOORS THROWN OPEN. AT RIGHT—A CLOSE-UP OF THE PLATFORM SHOWING THE TREADLE CONSTRUCTION

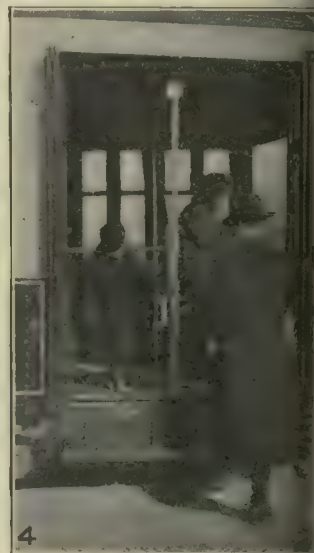
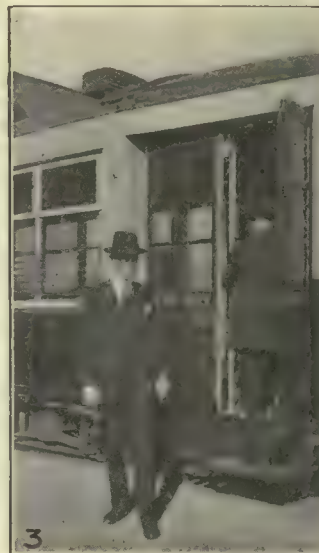
having the exit barrier as described for the single-truck car, in the exit passageways. Four 25-hp. motors, and a light pair of double trucks, specially designed to carry the center plate loads, were used. A line breaker was installed under the car floor to eliminate the objectionable platform circuit breakers, and a pneumatic tripping mechanism operated during an emergency application of the safety devices was installed directly in the line switch box. This car weighs 28,050 lb. completely equipped, and has a seating capacity of forty-five passengers. The aisle width between the end plates of the cross seats is 28½ in., which permits a free movement of passengers toward the rear end after the seating capacity has been exceeded.

The details of the design involve a

a maximum number of passengers in the most efficient manner on a car operated by one man, and at the same time to avoid distracting the operator's attention when he is collecting fares, has led to a further development for the protection of the exit passageway against passengers boarding the car there. This has been accomplished by making the exit doors automatic in their operation, through the medium of a treadle similar to that used with the exit barrier operation previously described. In this arrangement the entrance doors are connected with the safety control equipment and operate without any changes through the brake valve furnished with that equipment. The exit doors are opened by a passenger stepping on the treadle, which is made large enough so as almost com-

We believe that this automatic exit door simplifies the problem of rapid loading and unloading of passengers on cars operated by one man, and eliminates all objections that have been raised to the use of double passageway on a car of this type. The operator of the car is relieved of the necessity of giving any attention to alighting passengers when he is busy collecting fares. In cold weather passengers may be allowed to leave the car when there are none to board same without throwing open both doors.

The double-truck car has been equipped with two of these automatic exit doors, and is now in operation. We are making observations at the present time and are following the operation very closely. The door is interlocked in such a manner as to safe-



AUTOMATIC EXIT DOORS ON CHICAGO SURFACE LINES' DOUBLE-TRUCK ONE-MAN CAR

Number One. A passenger standing on the treadle cannot open the exit door until the brake handle has been moved to the door-opening position.

Number Two. The exit door does not close until the passenger has entirely cleared the step.

Number Three. After the passenger takes

his foot from the step, the exit door automatically closes almost instantaneously.

Number Four. A "feather weight" passenger on the treadle will operate the door.

number of interesting construction features, in all of which consideration has been given to the question of weight. In no instance has proper strength been sacrificed, and the structure is such as to give a very rigid construction with ample provision against excessive damage from minor collisions.

The car was completed and placed in service about the middle of December, 1921, and has since been in successful operation, handling passengers in a very much more satisfactory manner than the smaller car.

Considered from the standpoint of speed in handling passengers, it has been found that double passageways are a decided improvement and very much more satisfactory than the single passageways. Preliminary observations on our single-truck car, having double passageways, in comparison with cars having single passageways, have up to the present time shown a reduction of 31 per cent in time of passenger interchange, at stops where similar conditions prevailed.

Our study of the problem of handling

pletely to fill the exit passage, and makes it practically impossible for the passenger to stand in front of the exit door, without standing on the treadle. The exit doors cannot be opened by the passenger until a full brake application has been made, and brake valve handle moved to "door opening" position.

The door closes automatically and quickly with no supervision from the operator when the passenger has cleared the exit step. This is for the purpose of preventing boarding passengers from entering via the exit door. The door does not begin to close, however, until the alighting passenger has entirely cleared the step. When several passengers are leaving the car in succession, the door remains open until the last passenger has cleared the step. Provision is made to prevent jamming any one who might be caught in the door by attempting to enter through the exit side. When both the entrance and exit doors are open, they may be closed, even though a passenger remains standing on the treadle, by moving the brake-valve handle to the "door closing" position.

guard against accidents due to the carelessness of the passenger or the operator of the car.

In considering the general problem of handling passengers under the control of one operator, we believe that any arrangement for cutting down the time of interchange should from the standpoint of safety provide for all movement or interchange of passengers to be directly under the observation of the operator. This means primarily that all such interchange must be effected at the front end of the car, and it is therefore particularly desirable to so design this type of car that there will be ample aisle width and space within the body at the front end to facilitate the ready movement of passengers. For city service, where short periods of comparatively heavy congestion occur, a double-truck car properly designed offers a more flexible unit and affords a more attractive service to the public than the single-truck car. For the operating requirements on a great many interurban properties the double-truck car is also entirely applicable.

How Electric Railways Are Being Advertised*

Birdseye View of the Work Being Done to Improve Public Relations by Typical Properties Scattered from Coast to Coast—The Essentials of Good Work Are Stated to Be Frankness, Brevity and Clarity

BY LABERT ST. CLAIR

Director of Advertising Section
American Electric Railway Association

IT SEEMS to me to be worth while no longer to tell electric railway men about the value of good public relations. This has been shown by the results that have accrued to the companies that have tried to improve them. Electric railway men are tired of waving forefingers wagged in their faces, along with the declaration that the goblins will get you if you don't watch out." It is time to declare a holiday on the wagging forefinger and substitute some plain talk on how companies that are doing constructive public relations work are achieving success.

Advertising, publicity and public relations work generally have developed rapidly throughout the electric railway field in the last three years. Today approximately fifty per cent of the companies in the country, including virtually every large company, are engaged in this work in some form. The work of getting the electric railway story to the public finally is being divided along constructive lines. A smooth working plan of co-operation between local companies, state committees and our national association has been worked out. The Illinois committee has done splendid work, not only within its own State but also in blazing the trail for other state committees.

Taking the Illinois plan as a model, more than twenty-five states now have organized state committees and more are being organized right along.

There is scarcely a state in the Union which today does not have several electric railway companies that are doing big outstanding advertising and public relations work. For example, starting with Massachusetts we find the Eastern Massachusetts Street Railway operating a plan of community committees successfully. This company co-operates with the car riders in each community in forming a community committee to consider all questions as to service.

In Providence, R. I., the United Electric Railways is just beginning an advertising campaign. And coming down to Connecticut, we find the Connecticut Company engaged in intensive progressive public relations work. President Julius S. Storrs, of this company, carries the electric railway story directly to the car rider in many different ways. One of the most successful things that he did was to wage a fight in the Legislature against unregulated jitney competition through the medium of a leaflet. With this single advertising medium and personal work in a few months he got the required legislation.

He also has a policy of frankness with the newspapers which works.

In New York City the car card as used in the subways is well known, and in Brooklyn we find C. E. Morgan, the general manager of the Brooklyn City Railroad, addressing groups of employees daily in an effort to humanize his company. He also uses company publications, car cards and other advertising material to good effect.

In Philadelphia, the P. R. T. long since learned the efficacy of the car card and is making broad use of it and other advertising literature. Using the car card and leaflets as its advertising medium, this company once saved the skip-stop for its service which meant a million dollars a year.

Nowhere in the United States is found a smoother working public relations machine than that which has been set up by C. D. Emmons, president of the United Railways & Electric Company of Baltimore, Md. Here, every executive who comes in contact with the public is definitely assigned to a task. One man's activities center around local clubs; another is assigned to charities and other civic activities; a third deals with the politicians and public meetings, and a fourth is active in the Advertising Club and in newspaper circles.

Down in Richmond we find the Virginia Railway & Power Company using car cards and leaflets with highly successful results. This company recently passed through a bitter strike. By using the mediums mentioned as well as newspaper space, the company won a victory. In Charleston the street railway is headed by P. H. Gadsden, who proves his belief in advertising and public relations work by using newspaper space liberally to advertise his service.

Skipping along to Atlanta, Ga., we find P. S. Arkwright, president of the Georgia Railway & Power Company, pursuing a policy of frankness in dealing with his public and his men. He has the happy faculty of talking from the angle that is most interesting to the audience he addresses. For example, he talks electric railway service to merchants in terms of shoes, overalls, lollipops, etc. T. L. Small, in Baton Rouge, is effectively telling his story in 1-in. newspaper "readers." In New Orleans, the railway company has set a pace with car cards that is approached by few. In fact, the South is full of managements that are up on their toes courting the public.

In the North Central States some of the best work in the country is being done. Youngstown told its story effectively on the introduction of the monthly pass. The Northern Ohio

Light & Traction Company has created a better public feeling through boosting community spirit. Toledo sold its service-at-cost plan to the people through publicity. One company in this territory now is making a personal canvass of every citizen to determine what it can do, if anything, to please its riders better. The Union Traction Company of Indiana, under the direction of Arthur W. Brady, is doing safety work that might well be copied by any company. E. M. Walker of Terre Haute has sold the safety-car idea to his riders in a manner which has excited favorable comment.

In Illinois W. H. Sawyer of East St. Louis is doing effective safety work and the Illinois Traction System excellent general publicity work. All roads might profit by studying the merchandising-of-transportation plans and safety work put into effect by Britton I. Budd on the Chicago Elevated Railroads. Likewise, it is a pleasure to see the Chicago Surface Lines telling its story through car cards and otherwise taking the public into its confidence.

Going west from Chicago we find the Twin Cities getting the frank story of their electric railway problems from Horace Lowry. In Duluth, R. B. Thompson is carrying on a continuous newspaper advertising campaign. Kansas City is learning its local railway story through frank, open discussion by the company. Lincoln, Neb., has just started issuing a company leaflet that is vigorous in style and well printed.

Farther west is the Portland Railway, Light & Power Company, of which W. P. Strandborg is publicity manager. Recently he not only has cultivated the most friendly relations with his public and the newspapers but has successfully floated two large security issues.

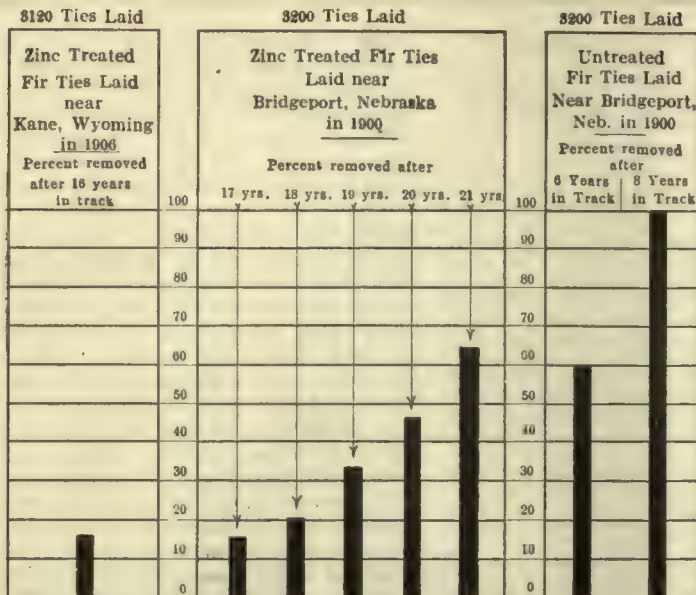
California is a territory that has been beset by bus competition of vigorous character. Paul Shoup and others in charge of the electric railway properties are continuing to "carry on." Through newspaper advertising, booklets, car cards and speakers, electric railway problems are being made clearer to Californians every day.

In conclusion, I repeat that *the electric railways are on their toes*. They are getting results, and those that are getting the best results are the ones that are following this brief rule in advertising and in public relations: Be frank. Be brief. Be clear.

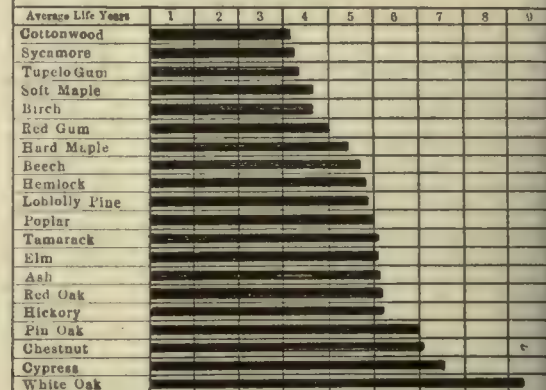
Safety Convention in Toronto

A JOINT safety convention under the auspices of a number of Canadian industrial and other organizations will be held at the King Edward Hotel, Toronto, on April 4 and 5. The convention is one primarily for employers, and the chief aim is to secure reduced compensation and eliminate unnecessary waste by extending the benefits of accident prevention in large and small industries. The chairman of the first session will be Sir John M. Gibson, K.C.M.G., president of the Ontario Safety League.

*Abstract of paper presented before the Illinois Electric Railways Association, Chicago, Ill., March 15-16, 1922.



COMPARATIVE LIFE OF TREATED AND UNTREATED FIR TIES

Chart
Showing the Average Life of
Untreated Ties

AVERAGE LIFE OF UNTREATED TIES OF VARIOUS WOODS

Tie and Timber Preservation*

Numerous Experiments with Various Methods of Treatment and Varieties of Wood Have Been Conducted by the Burlington Railroad During the Past Twelve Years

By J. H. WATERMAN

Chicago, Burlington & Quincy Railroad, Galesburg, Ill.

WHEN we began treating ties in 1898 we used a white oak untreated tie as a unit of measurement, the life of which was estimated at that time at eighteen years. It was thought then that if inferior wood like pine and

red oak would last eight years when treated, the maximum life had been obtained. Exhaustive tests that we have conducted over a period of twelve years have proved to us that treated soft-wood ties have an average life nearly 100 per cent more than was expected.

The accompanying charts and tables show the results of our various tests. It is especially interesting to note in the summary of the total ties placed in the experimental tracks during 1909 and 1910 that practically all of the untreated ones have been taken out. This summary includes the test results of ties of various kinds, each kind having been treated with the various processes.

*Abstract of paper presented before the Illinois Electric Railways Association, Chicago, Ill., March 15-16, 1922.

TABLE I—SUMMARY OF TEST RESULTS ON TIES OF VARIOUS KINDS TREATED WITH VARIOUS PROCESSES, AND PLACED IN EXPERIMENTAL TRACKS OF THE C. B. & Q. RAILROAD DURING 1909 AND 1910

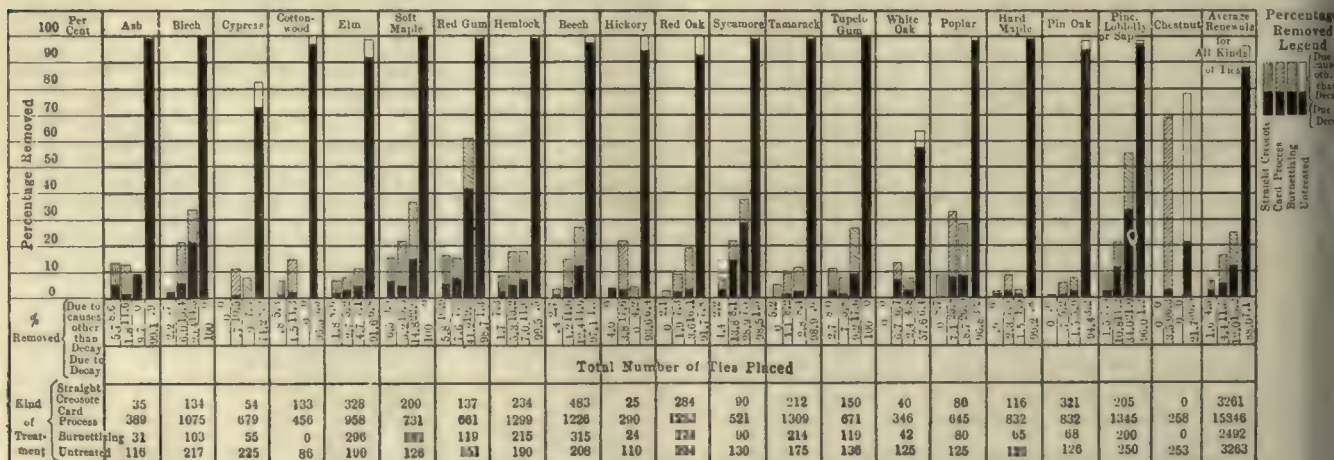
Process	Total Placed	Total Removed to Date	Percentage removed cause of Decay	Percentage removed for Other Causes
Straight creosote..	3,261	198	1.6	4.5
Card process.....	15,846	2,518	4.4	11.5
Burnettizing.....	2,492	629	12.0	13.2
Untreated.....	3,263	3,106	88.0	7.1

Note: Included in these percentages only are the ties placed in thousand lots on various divisions.

We have in our test tracks ties treated with the straight creosote, the Card, and the Burnettizing (zinc chloride) processes. A summary of the comparative life of ties treated with the two last processes in wet and dry climates shows how much longer life in the wet climate ties treated with the Card process give than to those treated with the Burnettizing process. The determination of proper treatment is largely a matter of experience. This is illustrated by the experience of one railroad which reduced the amount of zinc used from 1 lb. per cubic foot to 1/4 lb. Although theoretically the lesser amount was sufficient, several

TABLE II—COMPARATIVE LIFE OF TIES TREATED WITH THE CARD PROCESS AND THE BURNETTIZING PROCESS IN THE WET AND DRY REGIONS

Process	Region	Number Placed	Number removed	Per Cent removed cause of Decay	Per Cent removed for Other Causes
Burnettizing	Dry..	773	156	3.9	16.0
	Wet..	1,719	473	13.7	11.0
Card process	Dry..	4,270	543	2.5	10.0
	Wet..	11,576	1,975	4.9	12.0



GRAPHIC RECORD OF RESULTS OBTAINED BY BURLINGTON RAILROAD WITH TREATED AND UNTREATED TIES OVER A PERIOD OF TWELVE YEARS

years trial showed that those treated with a half-pound of zinc per cubic foot gave at least double the life of the others.

BRIDGE LUMBER AND PILING

Everyone, I believe, will agree that bridge lumber and piling ought to be treated. We have many bridges where the piling is apparently just as sound as when driven. In this case the treatment was with straight creosote by the full cell process.

In regard to seasoning ties and lumber before treatment, my observation has been that piling placed in the storage yard in the fall can be carried through until the second winter before it begins to deteriorate. In our loca-

tion red oak piling ought to be seasoned from fourteen to sixteen months to gain the maximum benefit from treatment with preservatives.

In the past few years, during which I have watched closely ties under rail joints, I have found that they wear out much faster than those in the same tracks which are between the joints. Loose bolts have been found to be the cause of this severe mechanical wear.

It is hardly necessary for me to say that good ballast lengthens materially the life of a tie. A sufficient amount under the track helps to keep the ties dry by furnishing better drainage. Longer life of the ties may also be expected because of the more firm bed provided.

story, leaflet or display advertisement by local companies. The section also co-operates with the committees on merchandising of transportation and safety, and assists other committees in the preparation of advertising material.

The association also, through its various committees, constantly watches the trend of national affairs with a view to promoting co-operation between the industry and the public as represented by governmental bodies. For example, its Washington office and its committee on national relations look after the interests of companies affected by the jurisdictions of the Interstate Commerce Commission, the United States Railroad and Labor Boards and the public service commissions of several states. At the present time the committee on national relations is co-operating with the other utility associations through a national joint committee in the study of such questions as the exemption from taxation of state and municipal securities.

The effort of the association is always to co-operate with government officials and as a result its relations with them are cordial. One of the most recent activities was in connection with a request from the Joint Committee on Agricultural Inquiry of Congress. In this case information was furnished covering the connection of electric railways with the transportation of agricultural products. As originally planned the scope of this inquiry was far more extensive than necessary and would have involved obtaining much material that would have been of no use to the commission. The collection of this material would have cost probably \$200,000. The chairman of our committee on national relations and the executive secretary conferred with representatives of the commission and supplied all of the needed information immediately and at no cost.

Manufacturers and operators work together splendidly in this association. An instance of this is found in the recent formation of a manufacturers' special committee to spread the facts about our industry through manufacturing channels.

The association distributes monthly more than 6,000 copies of its magazine, *Aera*, devoted to educational articles largely by executives and heads of departments. It maintains close co-operation with the United States Chamber of Commerce, the National Industrial Conference Board, the American Engineering Standards Committee, the National Safety Council and other national organizations. Through its affiliated associations, the American Association keeps abreast of all that is newest and best in these different lines of activity.

Finally, the association's published proceedings form a valuable reference library of the progress and development of the electric railway industry. The reports of the standing committees represent the work of the best brains in the industry, and their recommendations and conclusions are available in these published reports.

What the American Electric Railway Association Does and Stands For*

A Summary of the Facilities Which the Parent Association and Its Affiliated Organizations Have Placed at the Disposal of the Members, and a Statement of What the Association Is Doing for the Public

BY ROBERT I. TODD

President American Electric Railway Association
and President Indianapolis Street Railway

THE spirit of the American Electric Railway Association is one of progress. Its purpose is to help the railways to serve the public adequately. The aim of its members is to make transportation safe and reliable; to give rides at the lowest possible cost; to furnish steady employment at fair wages to our employees, and to earn a fair return on invested capital.

As mutually helpful understanding is growing today between the public and the utilities, the impression that one is necessarily the enemy of the other is fast disappearing. Utilities, perhaps more than ever before, are facing their problems squarely before the public, and the public is studying and appreciating these problems more than ever.

The outstanding efforts of the association are first to show its members how to improve their service and next to help them sell the service to the people. The association is a clearing house for facts of vital interest to the industry. Through committees and a trained staff at headquarters it strives to supply to the railways the best information as to the conduct of properties and to the public the facts about their work which are of vital interest to the public welfare.

The climax of the association's activities is reached twice a year, at the midwinter meeting and the annual convention. All of the committees function under a regular schedule, the executive committee meeting monthly.

One of the outstanding activities of the association is the conducting of a Bureau of Information and Service, which supplies information relating to fares, working conditions, fares, buses, de-man cars, and many engineering

traffic and operating problems. Information for this bureau is obtained through clippings covering the principal trade and technical publications, public service and court decisions and questionnaires and other communications addressed to members.

As exhibits in court cases or hearings before public service commissions, as evidence in arbitration proceedings or for the purpose of merely fore-arming a member company when entering a wage negotiation, the reports and compilations prepared by this bureau have proved of inestimable value. More than 10,000 inquiries were answered last year by this bureau.

One of the newer activities of the association is the Advertising Section, financed by the Committee of One Hundred and designed to give service to all companies. The formation of this section was the outgrowth of the industry's first organized attempt to tell the story of its problems to the public at the time of the formation of the Federal Electric Railways Commission.

This section operates under the direct supervision of the committee on publicity. It has an experienced advertising man in charge. It constantly strives to induce companies to increase their advertising.

The Advertising Section prepares and releases news and advertising material for use through various publicity channels. It co-operates closely with the state committees on public utility information and other publicity divisions of national public utility organizations. It also renders a personal service to companies that desire it. Any manager may write to the section and secure, without charge, advice as to his particular problems. When a local problem assumes national interest a special investigation is made and a report is issued for release as a news

*Abstract of address delivered before the American Electric Railway Association in Chicago, Ill., March 15-16, 1922.

A. R. E. A. Convenes in Chicago

Vast Amount of Information Covering the Usual Wide Range of Topics Brought in by Committees of Railroad Engineers at Their Twenty-third Annual Convention—Material Pertinent to Electric Railways Is Presented

THIS year at the twenty-third annual convention of the American Railway Engineering Association, held in Chicago, March 14 to 16, the twenty-three standing committees added a wealth of information to that already accumulated. An attendance of 2,000 members broke all records of participation in the Engineering Association proceedings. Differing from the work of the committees presented at last year's meeting, the preponderance of research done during the past twelve months was along the line of way matters. Although there is an increasing possibility of, and tendency toward, trunk-line electrification, but little investigation was made in this direction.

As with the electric railways, the steam railroads have found that the necessity for effecting the greatest economies possible has been more pressing than ever before. Their foremost problem, the labor question, was the subject of detailed investigation. For the purpose of studying some phases of this question, the association has actively at work two committees, one on the economics of railway labor and another on the economics of railway operation. Another committee whose work is tending to produce economy of operation is that on standardization. This work is designed to reduce the multiplicity of specifications for the various materials required in daily use on the railroad and to permit of the production of so-called standard materials at a smaller cost than is possible under present practices.

President Downs in his address at the opening session of the association dwelt on the failure of the steam railroads to attract technically trained men. Out of twelve replies to questionnaires from various universities came the information that during the past ten years there were 3,003 graduates in civil engineering, and surprising as it may seem, only 272, or 9 per cent, are working for the railroads. Though not finding out how many of the men of the engineering department of the railroads were graduates of engineering schools, Mr. Downs found from a count made on two railroads that employed about 350 engineers that only about 50 per cent were graduates of technical schools. Some immediate effort must be exerted, he urged, to bring technical men into railroad work. A canvass made by him discloses the fact that the average monthly salary paid to the young engineering graduate entering railroad work is \$118.

Speaking more of what the railroads can do toward developing their present engineering personnel, R. C. Marshall, Jr., general manager Associated General Contractors of America, said that

there still exists a need for the railroads to produce more executives with both engineering skill and a knowledge of business and transportation economics. The difficulties attending future development of railroads as private projects have greatly increased in complexity. These new problems open an extensive field for combined engineering and economic studies. There is every reason to believe that the engineer can take up these studies of railroad building and solve their problems more readily than an executive with no engineering experience. This new field, he concluded, offers an opportunity for development of the highest type of executive ability and with it will go a high degree of prestige and compensation.

The following abstracts of the various committee reports have been made rather to indicate the scope of the committee work than to present the actual data and information.

Reports of Committees

The report of the committee on electricity, of which Edwin B. Katté is chairman, included the result of studies made during 1921 on the subjects of electrical interference, water power, electrolysis, overhead transmission line construction and third-rail and overhead-line clearances. The committee also reported the result of its review of the National Electric Safety Code, issued by the United States Bureau of Standards, submitted railroad specifications for commercial adhesive and rubber insulating tapes, and stated that next year a study will be made of railroad specifications for electric light, power supply and trolley line crossings between steam and electric railways. It is also intended to report on insulators with a view to preparing plans and specifications for standardizing them.

The sub-committee on electrical interference submitted a progress report only, which included tabulations of possible mitigating measures that may be employed, but made no definite recommendations as to their practicability. The committee recommended that the subject be continued with a view to establishing, if possible, remedial measures.

In reporting on the utilization of water power for railroad electric operation, the sub-committee on water power was instructed to co-operate with the United States Geological Survey in its super-power survey. The report on the super-power survey was not available until shortly before the conclusion of the committee's work, so that it was

not afforded an opportunity to give the survey the comprehensive study warranted by the importance of the subject. However, the sub-committee did issue a report dealing specifically with sources of electric power available for the operation of railroads within economical reach of the Niagara and St. Lawrence Rivers and tributaries of the St. Lawrence River.

In its summary this water-power sub-committee said that there are at present, at Niagara Falls, hydro-electric developments under the control of the United States totaling 486,000 hp., of which amount practically none is available for railroad electrification. However, there is being developed at Niagara Falls under existing treaty provisions, 660,000 hp. additional, of which 210,000 hp. is on the American side. Of this latter amount, 100,000 hp. is available for railroad electrification and is sufficient for local requirements only. There are possibilities, subject to treaty revisions, of developing on the American side 600,000 hp. additional, of which the greater part may be available for railroad electrification. This would be sufficient to furnish power to a large proportion of the steam railroads within economical transmission distance. There are existing, or under development, other installations such as the Canadian Chippawa-Queenston project and that at Shawinigan Falls. Power from these plants is not available for railroad use in the United States. Other projects are under contemplation, such as the Niagara Falls Union and the St. Lawrence Waterway. While such power would be available for railroad electrification, it is not believed that the projects have yet reached the stage where the committee can report as to their applicability.

The transmission of power developed at Niagara Falls is limited in distance only by ability economically to construct and safely to insulate the transmission line. Also from Niagara Falls, power can be delivered to large consumers within economical transmission distance at approximately 1 cent per kilowatt-hour, which figure is sufficiently attractive, as compared with present costs of steam production, to warrant serious consideration as to its use for railroad electrification.

On the subject of electrolysis, the sub-committee charged with the duty of studying that subject reported that it co-operated during the past year with the American Committee on Electrolysis. The American Committee has completed a comprehensive report which was abstracted on page 913 of the *ELECTRIC RAILWAY JOURNAL* for Nov. 19, 1921. The committee had

nothing to report this year as to the effect of electrolysis on reinforced concrete other than to say that experiments are being continued in the laboratory of Swarthmore College and it is hoped that interesting results may form the basis of next year's report on this subject.

The sub-committee on co-operation with the United States Bureau of Standards had prepared a commentary on the National Electrical Safety Code with the object of acquainting the members of the association with the manner in which it can be used to advantage and wherein the code requirements differ from accepted railroad practice. After preparing this detailed commentary, the committee recommended that the railroad specifications for electric light, power supply and trolley line crossings, steam and electric railways, adopted by the association in 1920, be opened for revision with a view to making them conform with the code as far as consistent with established railroad standards, conferring with other interests giving special attention to the following items: (1) A definition of the grade of construction; (2) minimum overhead clearances; (3) clearances between lines and between conductors and supports; (4) minimum size and material of conductors; (5) unit stresses on steel and wooden crossing supports; (6) grounding of arms and guys; (7) grade of construction on branch lines.

After issuing questionnaires to about twenty representative railroads requesting information regarding railroad transmission and distribution lines at present in operation, the sub-committee on overhead transmission line construction reported that some data of interest had been collected. The subject of transmission line standards is extremely active just now. Specifications have been issued or are being considered by several state public utilities commissions, and by various technical organizations. The establishment of common standards for power work and reduction in the present number of types and kinds of line construction material is very desirable from an economic standpoint and the committee hopes to co-operate with other bodies to promote this result.

Since by far the greatest experience and development in transmission and distribution line construction has been that of electric power companies, it seems probable that types of good construction which have been found satisfactory for them may be adequate for lines of a similar class for railroad use. However, the proximity to railroad tracks presents a hazard to trains from pole and wire failures, which is an important consideration. The most important difference would probably be the fact that railroad lines are usually confined to a restricted right-of-way. Next year the committee hopes to submit some specifications for a standard transmission line construction.

Some interesting data regarding third-rail and overhead clearances were presented in tabulated form by the sub-committee charged with the investigation of this subject. Information about the type of contact, the protection, the mileage in operation, etc., of third-rail lines was tabulated for twenty-five heavy traction and electric railways. Corresponding data of electrified steam roads and interurban lines were listed for the clearance of overhead lines. These data among other things include the size of the conductor and the type of contact device used.

The standardization committee this year presented specifications for friction and rubber insulating tape which it recommended for adoption. These railroad specifications cover completely the material to be used, the manufacture, the chemical properties, the physical properties and tests, the standard weight, dimensions and variation, the packing and marking, and the inspection and basis of rejection.

WAY MATTERS REPORTED ON

The following abstracts cover the reports on track and allied subjects, which for convenient reference have been arranged under committee titles:

Committee on Ballast.—The principal work accomplished by the sub-committee on ballast was a report on time and cost studies covering the application of ballast, giving particular attention to the organization of the ballast gang and also to the organization of small emergency gangs. Some valuable data were presented in tabulated form of the time required, cost of skeletonizing track, of unloading ballast, of placing and dressing ballast, and then in a recapitulation, the cost per mile of ballasting main line track. The committee considers all figures supplied to it to be very creditable. The committee also presented the specifications for ballast shovels. It had also prepared a design for a spot board with the necessary holder and raising block.

Committee on Stresses in Track.—A progress report was submitted stating that the principal work of the year 1921 had been the reduction and correlation of data of the field tests made in 1920, the principal purpose of which was to determine the effect of curvature of track upon the stresses in the rail caused by locomotives of different types running at different speed, as compared with the stresses developed in straight track. Another line of work which was carried on was the investigation of stresses developed in the various parts of the rail joint at ordinary wheel loads.

Committee on Rail.—This committee reported that it had been giving consideration to the revision of the specifications for steel rails and expects to have something to submit soon. Also during the past year it devoted considerable attention to the details of rail

manufacturing practices of the several rail mills of the country, with reference particularly to the influence they have on the properties of the finished rail. It is thought that the most important item in the manufacture that affects the quality of the finished rail is the condition of the steel as it is poured into the mold. The committee found from its annual statistics on rail failure that the war-time rollings and particularly the rails rolled in 1917 are not showing up very well.

On the subject of steel rail inspection the committee presented a résumé of the practices of various roads and also a schedule of recommended practice. In this connection a paper was submitted by M. H. Wickhorst on "A Formula for the Elongation of Rails in the Drop Test." Mr. Wickhorst also prepared a discussion on fissures, which has been revised and the bibliography has been extended five years to include the year 1920.

Committee on Economics of Railway Labor.—The problem of furnishing labor for railway service, the committee says, is complicated by fluctuation in the available supply in labor markets, by the seasonal nature of trackwork and especially by that class of extensive improvements usually termed construction work. Because of local weather and climatic conditions, it seems impracticable to recommend a country-wide plan for the permanent employment of laborers in the maintenance of way department, but consideration is recommended for a much broader all-year program of maintenance work and a permanent force wherever conditions permit.

The conclusions reached were that the best results may be obtained by providing some officer or some organization to supervise the selection and care of employees, that the living conditions of employees should be sanitary and comfortable, and that free transportation for railway labor should at all time be within the control of regularly delegated officers or employees.

Committee on Standardization.—This committee was appointed last year to promote the use and formation of association standards by acting as a clearing house for the recommendations of the various A.R.E.A. committees. This year it recommended that five subjects be submitted to the American Engineering Standards Committee as a basis for standardization. Among other things, these include tamping tools, tie specifications, railway lamps and commercial adhesive tape and rubber insulating tape.

Committee on Uniform General Contract Forms.—A few minor revisions were suggested to be made in the Manual. The committee has drawn up for adoption a form of license for wires, pipe, conduit and drains on railroad property and has offered for criticism and suggestion a form of license for private road crossings.

Committee on Signs, Fences and Crossings—On the basis of information obtained by circularizing a large number of railroads in regard to the location of signs with relation to the track, location with relation to the object effected and details of any local state or public service commission laws or orders applying to the location of signs, it was recommended that all mile posts, bridge numbers, section and such signs be located at a distance from the center line of the track to the nearest space or edge of the sign of 10 ft. 4 in. Highway crossing signs should be set at a distance of 17 ft. from the center line of the track and 300 ft. in advance of the crossing. Because of the high price of wood crossing signs there has resulted in recent years the introduction of a number of substitutes. Seventeen have come to the attention of this committee, which grouped them in five classes in accordance with the material of their construction. Information was presented covering ninety-five individual crossings, and data in regard to others were obtained from railroad users and from the manufacturers. For the most part, these crossings have been in use but a short time and a definite conclusion as to maintenance costs and service cannot be reached. Comprehensive specifications were submitted by the sub-committee to which was assigned the preparation of plans and specifications for concrete fence posts. The specifications which it recommends for criticism deal with the materials, the proportioning and mixing of the concrete, the depositing of the concrete, and the curing and handling of the posts. Typical drawings of end posts and brace handles for a right-of-way fence with concrete or steel line posts were included with the report.

Committee on Ties—The specifications for a standard tie and the practice to be followed in its installation were submitted for approval so that there may be some unit of comparison. The recommendation regarding a test installation is that an equal number, though not less than a hundred, standard test ties be installed at the same point in the same track under identical traffic, rails, ballast, drainage and sunlight conditions. The test record should be continued until all standard test ties have been removed as well as all other ties of the test. The standard test tie is to be according to the A.R.E.A. 1921 specifications, grade 3, 6 in. x 8 in., class-U, white oak, 8 ft. long, untreated. A form is provided to record such information as location, kind of ballast, tangent or curve percentage, tie plate, weight of rail, rail fastenings, size and kind of ties, etc. Additional data to be included cover the gross tonnage per year passing over the test ties, the annual average rainfall, the mean temperature of the locality and the kind and depth of ballast.

Some tables have been prepared from

the returns to the committee's questionnaire as to the life of ties. The first table concerns untreated ties only, and its information is limited to returns which indicate that the failures were more than half caused by decay, and it is, therefore, an effort to compare the decay-resisting qualities of various kinds of untreated timber. A second table shows the relation between the specific gravity, beam strength and rail-bearing strength of timber used for cross ties, and from it the conclusion can be drawn that the strength of various kinds of timber can be said to vary with the specific gravity.

Conclusions reached by the committee as to the effect of size of ties and the use of tie plates were based on the general belief as expressed in the questionnaires that a tie 7 in. x 9 in. would outlast one 6 in. x 8 in. when subjected to the same conditions, by about 25 per cent. The data relative to ties failing by decay show an average for plated ties of 30 per cent greater life for the 7-in. over the 6-in. ties, and for unplated ties, 20 per cent greater for the 7-in. over the 6-in. It was also found that the value of the tie plate in the case of 6-in. ties is 12 per cent greater life, and in the case of the 7-in. ties, 21 per cent. The greater value of the tie plates with the 7-in. ties may be ascribed to the fact that 7-in. ties are, in general, used under heavier traffic.

There has been very little activity as regards substitute ties during the past year. The test installations as a rule are being continued, but a few have been discontinued. Reports in three installations not heretofore included were made. Two of these installations consisted of but a few ties each, but the third is a 3,400-ft. section of track on the Pere Marquette Railway laid with Kimball concrete ties in a concrete foundation. The ties laid in 1901 and 1902 consist of two concrete blocks under the rails connected with each other by two 3-in. channels and all imbedded in the concrete foundation of the street and track. The ties supported 75-lb. rail, which was changed in 1914 to 90-lb. rail, at which time about 50 per cent of the wood blocks were renewed. Records of the various ties now under test were brought up to date.

Committee on Iron and Steel Structures—The principal accomplishment of this committee during the year was the drawing up of general specifications for the erection of fixed span steel railway bridges less than 300 ft. in length, and the compilation of specific and detailed rules for the design and manufacture of movable railway bridges. These latter specifications are submitted as a conclusion by the committee, which believes them to be the best specifications for movable bridges now available. They are intended to be a guide to both the designer and the shop rather than merely a statement of principles.

Committee on Wood Preservation—Of the different chemical preservatives available the committee stated that there is no question about the use of

creosote oil being preferable. Zinc chloride in a mixture with creosote oil is used with much success in certain regions. With present scarcity of creosote oil, economy demands that some other preservative be used. It is imperative, therefore, that the zinc chloride treatment be more widely used. To its report the committee added the record of the completed tests made by the Forest Products Laboratory, Madison, Wis. The summaries of these records for zinc-chloride-treated ties show that the average life for twenty-three test sections in Texas was 8.2 years; for ten sections in California, 9.9 years; for twelve sections in Pittsburgh-Chicago, 9.1 years; for seven sections in Connecticut, 7.1 years; and for six sections in Nebraska, 9.2 years. The average life of twenty-three test sections of ties treated with zinc-creosote in Texas was 12 years. For creosote treated ties no average figure is given, but the life ranges between 6.4 years and 20.2 years for different roads in various parts of the country.

The outstanding development in the preparation of Douglas fir ties for treatment is the perforating process. The machine used for perforating ties was described in the *ELECTRIC RAILWAY JOURNAL* for April 30, 1921, page 819. The sub-committee has also carried on some experimental treatment on thoroughly seasoned Douglas fir ties, both perforated and non-perforated. The summary of the result obtained brings out that the perforated ties, given the same treatment as the others, show a much higher absorption in volume percentage. Photographs are included in the report which show the uniformity and depth of penetration that this process allows. Other sub-committees have also made extensive studies of Pacific Coast marine piling, preservative treatment to be used on piles and timbers on land construction and methods for storing lumber and piling for air seasoning preliminary to preservative treatment.

Committee on Wooden Bridges and Trestles—The committee has drawn up a plan which it recommended as standard practice for a light and heavy design of open-deck pile trestle. For approval it has also prepared a design for a heavy and light open-deck frame trestle, a multiple-story trestle and a ballast deck trestle. Although in last year's progress report a 12-ft. span was suggested, after careful consideration of the advantages of a 16-ft. span where flood conditions exist and in zones where Western fir can be readily secured, it decided to include both spans. After considering carefully the loadings it was decided to keep in harmony with those of the steel specifications, which are Cooper's E-60 and a load which shall not be in any case lighter than three-fourths this amount. For any structures designed to carry more than E-60 steel and concrete of course should be given serious consideration. The exhibits that go with this report are detailed drawings of the various types of

construction for which it recommends standardization.

Committee on Masonry—Tentative specifications for cold-drawn steel wire for concrete reinforcement have been drawn up by this committee. This covers the customary items of manufacture, physical properties and test, permissible variations in gage, etc. Tables prepared by Prof. Duff A. Abrams were presented as a part of the report. These tables give the proportion and quantities of material, using aggregates of different make-up, for concrete of various strengths and with different degrees of plasticity as measured by the slump test. The purpose of these tables is to furnish a guide in the selection of mixtures to be used in preliminary investigation of the strength of concrete from given materials, to indicate proportions which may be expected to produce concrete of a given strength under average conditions where control tests are not made, and to furnish a correct basis for comparing the relative quantities of concretes made from aggregates of different sizes when the plasticity and strength of the resulting concretes are taken into account.

Committee on Economics of Railway Location—On the effect of curvature on cost of maintenance of way and equipment, the committee has reached the conclusion that it is difficult to present information on this subject that would be of practical value. Its recommendation was that the subject be dropped. The sub-committee assigned to the subject of railway locomotive power is making a study of the various processes for predicting tractive efforts at various speeds, in the expectation of revising where necessary the present section on power in the Manual.

Committee on Shops and Locomotive Terminals—Of interest to electric railway men, perhaps, is the report of the sub-committee on passenger repair shops. It stated that the shops, yards, buildings and machinery should be arranged so that the various operations follow through in a logical sequence. The bad order equipment should pass in at one point, progress by various steps, without hindrance from congestion or awkward movement, over a predetermined circuit to the point of release, and emerge as a finished product. In general repair work a car will enter the shop, be unwheeled and stripped, after which the car, trucks and trimmings will progress through the shop, each over a different route, and will finally meet at some point for trimming, assembly and release. The committee also made some general comments and recommendations for the various shop subdivisions which go to make up a large passenger shop layout. In connection with this study the committee added comments on special features of some existing plants which are of considerable value.

Committee on Track—Ten plans for bolted rail crossings and eighteen plans for manganese steel insert crossings

were submitted for adoption. Valuable work has been done along the line of providing specifications for track tools. Plans were submitted for a pinch bar, lining bar, claw bar, track wrenches, adze, rail fork, spike pullers, track gage, rail tongs, track chisel, clay pick, spike maul, sledge, track level and track shovel.

Two tables were the result of the work of the sub-committee on gages and flangeways for curved crossings. The first one gives the approximate rigid wheelbase of locomotives in combination with the number of pairs of flanged drivers that will operate on the gage of track with curvature ranging from 6 to 33 deg. The purpose of the second table is to give the more nearly exact gage necessary for a given locomotive on a given curve. The figures have been verified by some observations and some comparisons with actual practice and conditions.

An investigation on the possibility of canting the rail inward revealed the fact that the Canadian Pacific Railway has used tie plates since 1914 which are inclined to a slope of 1 in 20, and that it is securing excellent results in so far as the wear on the head of the rail is concerned. Reports of continued tests on the Pennsylvania System indicate slightly more wear on the rail head with the inclined plate, and that there was practically no difference with regard to cut ties as between the inclined plate and the standard level plate. Neither of these installations had any special construction of frogs, switches and turnouts with inclined rail. In view of the fact that foreign practice is reverting to laying rails in the upright position, no definite conclusions were drawn on this subject. In regard to the reduction of taper of wheel tread the New York Central Lines are reported to have changed the slope from 1 in 20, which is the M.C.B. standard, to 1 in 38, which has been found a more favorable contour.

Committee on Roadway.—The sub-committee on shrinkage and swell of grading material found nothing that would lead it to change any conclusions previously made on this subject. It added that it seems to be impossible to find any rule for the swell of grading material, but it seems that the method of handling has considerable to do with the result secured. In regard to sliding of cuts and fills, the conclusion reached was that the primary cause of slides is the lack of proper drainage. In the construction of a new line where conditions indicative of future trouble with soft spots or slides are encountered, special attention to the diversion of the springs or streams which are likely to cause trouble should be given.

On investigating the chemical killing of weeds, the sub-committee found that the chemical mostly used is a mixture or compound of arsenic and caustic soda, using 8 to 10 per cent of the latter by weight and dissolving the solid chemicals in water. The application is made on any desired scale from a handcar,

single flatcar, or an entire train, all with proper equipment. A very convenient unit of measurement is 1 gal. of solution per foot of width per mile of roadbed, which appears to be ordinarily within the limits of 5 and 15 gal.; or a minimum application of 5 gal. per width of 8 ft. will take 40 gal. per mile, while a maximum application of 15 gal. per foot for 14 ft. width will take 210 gal.

Some roads also claim that the weeds should be allowed to attain their full growth before application, while others advocate applying the chemical to the growing weeds in order to eliminate them from the roadbed during the summer season. One road reports that after four years application it was decided to discontinue entirely the use of the weed killer and to resort to the weed burner, claiming that the weed killer did not destroy all the weeds and that those that did succumb were dried and left to foul the ballast.

Committee on Economics of Railway Operation—It has been found by the sub-committee on methods for increasing the traffic capacity of a railway that train operation can be represented by a mathematical law. The complete development of this law is included in the report. Its application to different sets of observations make possible a comparison of several months operation of a given division on a more equal basis.

By comparisons like this it is felt that the result of extreme weather conditions, greater track facilities, characteristics of motive power, character of commodities, supervisory methods and the average time on the road can be more accurately determined. An exhibit added to the report shows how closely actual conditions can be forecasted by application of the mathematical theory.

Committee on Rules and Organization—In connection with the use of mechanical appliances and tools with organization of labor involved, this committee has compiled some information on the use of machines and combinations of machines for doing special work. These include the methods used and cost of spreading ballast with a tie scraper and with a snow flanger. Also valuable data were given on the use of a gravel ballast unloader, pneumatic tie tampers, bonding machines, a rail handling machine, and ballast cleaning machine.

A.S.M.E. Spring Meeting at Atlanta

THE spring meeting of the American Society of Mechanical Engineers will be held in Atlanta, Ga., May 8-11. Preliminary events will take place at Charlottesville, Va., May 6 and 7, in co-operation with the A.S.M.E. Virginia Section. Immediately following the Atlanta meeting observation tours will be made to points in the South, including Birmingham, Greenville, S. C., Muscle Shoals and Pensacola, Fla.

New Englanders Discuss World Problems

At Annual Meeting of New England Street Railway Club, Men Prominent in Public Life Outline Problems of Reconstruction Period—Reports Showed Club as Prosperous—A. E. Potter Elected President

FOUR HUNDRED AND FIFTY members and guests of the New England Street Railway Club listened intently to addresses upon the great economic problems of the age in general and their local application at the twenty-second annual banquet of the organization, which was held on March 23 at the Copley Plaza Hotel in Boston. The club is in a most flourishing condition, 117 new members having been added during the year, while the cash balance reported in the treasury is \$3,900. During the usual business meeting preceding the banquet, A. E. Potter, president and general manager United Electric Railways, Providence, R. I., was elected president of the club for 1922-1923. By a rising vote, every member pledged his support to the new administration.

Hon. Samuel L. Powers of the board of trustees, Boston Elevated Railway, officiated as toastmaster after being introduced by the retiring president, Edward Dana. Hon. Channing H. Cox, Governor of Massachusetts, congratulated the club on its growth and influence and urged the membership to join as citizens and as a group with others in seeking the just interests of New England in the matter of transportation rates and other problems of importance to the Northeast. An honorary member of the club, Governor Cox was received with great enthusiasm.

Service as the motto of the electric railway industry, and particularly as exemplified locally, was attested by Hon. E. Mark Sullivan, corporation counsel of the city of Boston. In the absence of Mayor Curley, Mr. Sullivan welcomed the members to the New England capital, paying high tribute to the efforts of Chairman James F. Jackson and the other public trustees of the Boston Elevated Railway to give the Boston metropolitan district a great transportation system. The open-handed policy of this board in giving out figures upon the road's operations and explaining its economic problems, said the speaker, is winning the tolerant sympathy and confidence of the public. The policy of explaining these matters in simple, straightforward ways, he declared, will make friends of the people. Even under present trying conditions of rush-hour crowding, the good nature of the car-riders is evidently in part due to a recognition of the efforts of the trustees and their associates to provide good service under conditions frankly placed before the public.

Gen. Guy E. Tripp, chairman of the board Westinghouse Electric & Manufacturing Company, New York, reviewed the situation in Europe from the reconstruction standpoint, emphasizing the need of removing continental

trade barriers artificially set up, of reducing the excessive costs of state administration, and of stabilizing the currency and balancing governmental budgets. Until these countries live within their incomes, the speaker said, no reduction in their financial obligations to the United States should be considered seriously. A more extended résumé of General Tripp's address will be published in a later issue of the **ELECTRIC RAILWAY JOURNAL**.

Hon. John H. Crim, assistant attorney-general of the United States, was the last speaker. He made a strong plea for active participation by business men in government and condemned the tendency toward over-centralization of governmental functions at Washington, with its dangers of developing a reckless bureaucracy. Already federal officials are staggering under many burdens of local importance to the enforced neglect of national affairs. The terrible example of Russia, the speaker said, should suffice

for the proletariat nearer home. Optimism in the ability of the American business man to solve his governmental problems was emphatically voiced by the speaker.

Following an invitation by A. G. Bourry, Montreal, to the club to attend the eighteenth annual convention of the Canadian Electric Railway Association, June 1-3 at Quebec, the meeting adjourned.

During the afternoon business session the following officers were elected to serve during the coming year: President—A. E. Potter, Providence, R. I.; vice-presidents—Massachusetts, Ralph D. Hood, Haverhill; Connecticut, W. J. Flickinger, New Haven; New Hampshire, T. H. Kendrigan, Manchester; Vermont, T. B. Jones, Burlington; Maine, Fred D. Gordon, Portland; Rhode Island, Edward A. Brown, Newport; secretary—John W. Belling, Boston, Mass.; treasurer—Fred F. Stockwell, Cambridge, Mass.; executive committee—Edward Dana, Boston; Charles H. Wood, Boston; W. W. Field, Cambridge; F. B. Walker, Boston; George H. Martin, Boston; George H. McFee, Framingham; L. D. Pellissier, Holyoke. Finance committee—A. E. Potter, W. C. Bolt, H. B. Potter.

American Association News

American Association Executive Committee

THE March meeting of the executive committee of the American Association was held at New York headquarters on March 24. There were several of the usual routine reports of the executive secretary and some of the committees, including a financial report showing the cost of the midyear dinner. This proved to be about 60 per cent of the cost of the 1921 dinner.

In his report for the committee on national relations, Charles L. Henry said that there were three things of present interest in this field: The interchangeable mileage-book bill, the Bacharach bill, and an investigation of power brakes by the Interstate Commerce Commission.

As to the mileage-book question the committee hopes that it will be provided that railways which wish to take advantage of the joint mileage book may do so. The Bacharach bill is one which would provide that no recourse may be had by a public utility to any federal court in a question of rates until all possible steps provided by state law have been taken.

The power brake investigation is one which will apparently not affect electric railways, but only the question of heavy trains on steep grades.

Reporting for the publicity committee J. N. Shannahan said that its principal activity was in assisting the committee on co-operation with manufac-

turers. He reported very favorable results on the nation-wide publicity obtained for the Midyear Meeting.

With reference to the location of the 1922 convention, to be held in October, the executive committee, after a long and careful analysis, approved the report of the location committee. This recommended that the convention be held in Chicago, with exhibits, on the Municipal Pier. The recommendation of the sub-committee was reached at a largely attended meeting held in Chicago, March 15 and 16, with H. H. Adams presiding. The executive committee also authorized the appointment of a director of exhibits.

The executive committee passed a motion instructing the Engineering Association to appoint a committee on the cost of highway construction and maintenance. This was done in the belief that this is a subject related to bus transportation, about which the association should have information.

On recommendation of Mr. Palmer there was authorized the appointment of a committee to confer with a committee of the National Safety Council on problems of mutual interest. The executive committee then adjourned to meet in Baltimore, Md., on April 28.

Those in attendance at the meeting included: President R. I. Todd, J. N. Shannahan, C. S. Kimball, L. H. Palmer, F. E. Webster, C. L. Henry, L. S. Storrs, H. G. Bradlee, W. H. Sawyer, R. P. Stevens, J. G. Barry, C. R. Ellicott, J. R. Welsh and M. B. Lambert (guest).

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

City Wins New Orleans Case

Court Blocks Attempt by City to Conclude Negotiations Looking Toward Settlement of Railway Dispute

The State Supreme Court of Louisiana on March 20 handed down an opinion dismissing the suit for an injunction sought by the state to prevent the Municipal Council of New Orleans from making an agreement with the New Orleans Railway & Light Company permitting the collection of a higher rate of fare than 5 cents. This is the rate fixed in the original franchises held by the company.

The judgment of the court was unanimous. The court held that the Attorney General on behalf of the State had no cause or right of action and for this reason the State Supreme Court affirmed the previous judgment dismissing the suit.

In reviewing the case Justice O'Neil says the question presented is whether or not the authority to fix the fare in New Orleans is vested in the Municipal Council or in the Louisiana Public Service Commission. The authority of the commission, created in 1921 with the power of supervision, regulation and control over local public utilities, powers which its predecessor, the Railroad Commission, did not enjoy, is qualified by the expression in the law, "except as herein otherwise provided." And Section 7 of the same article declares that "the powers of supervision, regulation and control over any street railway, or other public utility now vested in any town, city or parish government" shall not be vested in or exercised by the Public Service Commission unless or until a majority of the qualified electors . . . shall vote to surrender such power."

No such election has been held in New Orleans. Justice O'Neil declares further that it is not pretended that the Legislature has deprived the municipal government of its rate-making authority over street railways or other local public utilities, since the railway franchises, which were the subject of the litigation, were originally granted by the Municipal Council.

The State of Louisiana has fifteen days within which to ask for a rehearing, but it is not likely that Attorney General Coco will take this step in view of the unanimity of the opinion of the state court of last resort. This decision practically settles the suit of the State in the United States Supreme Court, since the cause of action for the forfeiture of the franchise has been settled by the decision of March 20 by the State Supreme Court. It is expected the decision in the case pending in the United States Court of Appeals, on appeal from the district federal

court, where a ruling was rendered favorable to the railway, will follow along the lines of the opinion in the State Supreme Court.

Commissioner Paul H. Maloney, of the Department of Public Utilities, has wired G. M. Dahl, of the Chase National Bank, New York, to return to New Orleans. The idea now is to resume the negotiations which were abruptly broken off last August when the restraining order was issued by Judge Provosty of the State Supreme Court. At that time the negotiations with the Commission Council and the security holders had resulted in an agreement for the reorganization and refinancing of the company. This agreement provided for a 7-cent fare and gas at \$1.30 per 1,000 cu.ft.

The suit instituted by the junior security holders in the federal court, by which body the receiver was appointed and is now exercising authority, will have to be dismissed. Among the steps to be taken in connection with this phase of the matter will be the sale of the property under foreclosure and the discharge of the receiver.

Announcement was made by Receiver O'Keefe, who has just recently returned from New York, that arrangements have been made with representatives of the security holders to extend more than \$1,000,000 of certificates which fall due in April and to place an additional \$1,000,000 of certificates to pay for improvements already under way.

It is expected that it will take all of six months more to effect all these arrangements.

Looks Into Future—Sees Public Ownership of Trolleys

Public ownership of electric railways is inevitable. This was the judgment delivered by Peter Witt in a talk made recently before the Get-Together Club in the Hotel Bond, Hartford, Conn. Municipal ownership had come in San Francisco and in Seattle, was at hand in Detroit, and was due in Cleveland, in a future not far distant, he said. The transportation of the future was to stick to steel wheels.

Harrison B. Freeman, receiver of the Hartford & Springfield Street Railway, was toastmaster. He said that an electric railway must have the good will of the public and the co-operation of the public officials. Mr. Witt sees the day ahead when the electric railway will be free to taxpayers in the sense that the public will own the trolleys just the same as it owns the highways.

Lucius S. Storrs, president of the Connecticut Company, said that a transportation utility was a semi-public enterprise run by a private corporation charged with a public function.

New York Legislative Session Disappointing in Some Respects

The Legislature of New York adjourned on March 17. The session of 1922 was one of the shortest on record. Backed by a heavy Republican majority in both houses, Governor Miller's entire program as outlined in his message to the Legislature was written into law.

Measures involving public utilities were killed during the last minute rush. Among these measures were bills outlawing one-man cars, repealing the full crew law and relieving traction companies from paying charges. The New York city fare bill is referred to elsewhere in this issue.

Governor Miller's water power development program was approved. The first law provides for private development of the State's water power resources under supervision and control of the Water Power Commission and the Public Service Commission. The second law provides for State development or surplus canal waters, the initial development to be at Crescent Dam and Vusichers Ferry, near Schenectady.

The Port Authority program favored by Governor Miller and Alfred E. Smith, former Governor, was adopted for New York City over the protests of the Hylan administration.

Some of the measures passed by the Legislature and now in the hands of the Governor as thirty-day bills follow:

The Gibbs bill (Senate Print No. 804): Adding new section 67 transportation corporations law by permitting construction of electric lines over Indian reservations. The construction contemplated is in Erie County.

The Lowman bill (Senate Print No. 378): Amending Section 93 railroad law providing new provisions for maintenance of bridges over railroads.

The Dick bill (Senate Print No. 904): Adding new subdivisions 9, 10 and 11 Section 49 public service commissions' law, defining service-at-cost contract, authorizing municipal corporations of less than 1,000,000 inhabitants and street surface railroads to enter into such contracts, and providing that a domestic railroad corporate service commission.

The Kavanaugh bill (Senate Print No. 741): Adding new section 160 railroad law, providing that a domestic railroad corporation, other than a street railroad owning at least three-fourths of capital stock of another domestic railroad other than a street railroad, may acquire minority stock of such other railroad on an appraised valuation in aid of merger.

The Jesse bill (Senate Print No. 1659): Amending Section 183 railroad law, by permitting a street surface railroad to operate in any city by underground electric power to use tracks of other street surface railroads for not exceeding 2,500 ft. under certain conditions.

All of the special bills requiring certain street surface railroads which formerly operated between New York and Brooklyn to restore service failed of passage, although one or two of them passed the Assembly.

The Duell bill providing industrial courts for the settlement of disputes between capital and labor was killed.

Columbia Situation Clearing Up

Company Has Police Protection and Operates Under Railroad Commission's Orders

Events in the labor situation in Columbia, S. C., have moved rapidly during the past week. It will be remembered that car service stopped on Feb. 15, when the employees went out on strike because the company would not agree to refer all discharges of employees to arbitration. At the time last week's issue of this paper went to press, the Legislature had adjourned after increasing the Board of Railroad Commissioners from three to seven members, but the company was prevented from hiring new men to operate its cars because of an existing city ordinance.

This ordinance, which was passed in 1917, forbade the employment of any motorman or conductor on a street car within the city unless he had received instructions on the cars in Columbia for the fifteen days immediately preceding the time of assuming his duties, the instruction to have been given by a motorman or conductor who had been actively employed in such capacity in Columbia for the six months immediately preceding.

RAILROAD COMMISSION ACTS

Promptly last week after its appointment the new Railroad Commission, consisting of seven members, organized and ordered "The Columbia Railway, Gas & Electric Company to resume its street car service as soon and in such a manner and to such extent as it may be able, exercising due care and caution to employ such motormen and conductors as may be qualified and capable of operating its cars, and failing so to do, that it show cause why it has not done so or why it should not be peremptorily ordered to do so before this commission."

This order was issued under the authority granted under section 6 of the new railroad law which provided:

"The Railroad Commission is hereby vested with power and jurisdiction to supervise and regulate the rates and service of every public utility in this state and to fix such just and reasonable standards, classifications, regulations, practices and measurements of service to be furnished, imposed or observed and followed by every public utility in this state."

COMPANY OPERATES CARS

The company, therefore, on Monday morning, March 20, having recruited some new men, started operation. Up to 3 p.m. there was little disturbance, but by that time strike sympathizers gathered and began to make raids on a number of cars. As a result two operators and one passenger were injured so severely that they had to be taken to the hospital. The police arrested three strikers, members of the union,

and one strike-sympathizer for these disturbances. Late in the afternoon of Monday the cars were withdrawn until Tuesday morning and an appeal was made to the Governor for protection. The Governor said that he would do this, "even though the entire law enforcement force of this state, including the National Guard, be necessary to guarantee this protection." The company has a lawful right to operate its cars in peace and security, all the more so since this operation is being undertaken at the order of the State Railroad Commission."

CITY ACTS TO STOP VIOLENCE

On March 20, the day that car operation was begun, a body of the strikers appeared before the Council to ask that the ordinance of 1917 be enforced. They were rather taken back, however, when the city attorney, C. S. Monteith, declared that the State legislation increasing the powers of the Railroad Commission and the order of that commission had nullified and superseded the city ordinance which specified the qualifications of motorman and conductors, that the matter was now entirely in the hands of the commission, and that it was the duty of the city to afford police protection so that the company could resume its service.

After a consultation between the Mayor and chief of police on March 20 in regard to the best method of protecting of the cars, it was decided that each car would be convoyed by six police, five riding in an automobile behind the car, while a sixth followed on a motorcycle. On arrival at the city limits the protection is taken by rural policemen and sheriff deputies, convoying the car in the same way. The Mayor authorized the Police Department to engage any number of special policemen necessary to keep order. The Mayor said:

"Columbia police must protect the citizens and their property, and if we cannot do our duty we should step out and let others in who will."

On March 21 the board of directors of the Columbia Chamber of Commerce in open meeting passed a series of resolutions which, while expressing no opinion on the merits of the controversy, condemned the attacks on cars that had taken place, indorsed the steps taken by the city and county officials to prevent their recurrence and called upon the members of the union and their sympathizers to refrain from acts of violence.

The operation of the cars was conducted for seven hours on March 21 without any recurrence of violence. The police guard arranged for protection proved effective.

The four rioters who were arrested on March 20 were arraigned on charges of assault and battery with attempt to kill and were bound over for trial under bail bonds of from \$1,000 to \$3,000. Three more arrests were made for the disturbances on the previous day. It also developed that two of the cars attacked on March 20 were carrying

United States mail, which the company had contracted to deliver and that the Federal authorities had asked for information from the company as to the attacks on these cars.

On the afternoon of March 21, F. H. Knox, president of the company, issued a short statement expressing thanks to the state, county and city officers for the protection given to its patrons, employees and property. At a meeting of the union held on the evening of March 20, while no official action condemning the use of force was taken, the speakers, according to the president of the union, urged the men to refrain from attacks upon the cars.

Development Depends on Public Attitude

The best bet for the development of water power in Georgia is a favorable public attitude, from which will result private enterprise, according to Preston S. Arkwright, president of the Georgia Railway & Power Company. President Arkwright addressed members of the Rotary Club of Rome recently on the subject of water power development.

In spite of apparent opposition, what business men really want, said Mr. Arkwright, is the development of water powers and their use electrically. The company wants the water powers developed too, said Mr. Arkwright, and for this has fought constantly during its ten years' existence against a public opinion unfavorable to such projects. He asked the men to take an unprejudiced attitude.

Whoever can carry on the work most capably should do so, stated Mr. Arkwright, whether it be the Georgia Railway & Power Company or some other concern.

Boston Paper Talks About Trolleys

The *Boston Traveler* commenced on March 22 the publication of a series of seven articles on the trolley situation in Boston. It is in the form of questions and answers and began with the statement that there had been so much discussion on the subject of a 5-cent fare that the paper decided to get the entire story. When it began its investigation it was amazed to find that specific information could be got only from the public trustees and management of the elevated. Others contented themselves with the statement that there ought to be 5-cent fares, but when pressed for details became very hazy.

The paper declares it could not find, among the responsible and well-informed critics of the present public control law, any who would offer a definite substitute or definite plan for 5-cent operation. This applied even to the Mayor, who says that the fare should be a nickel, but has offered no remedy beyond a call for legislative action and saying that he thinks the situation a problem "for the best legal minds in the community."



STEPS TO ELEVATED WRECKED



STATION PLATFORM BADLY DAMAGED

Fire Ties Up Chicago "L"

Platform and Ties Destroyed Following Collapse of Building in \$8,000,000 Fire Which Wiped Out a Block

Service on the Metropolitan-West Side Elevated Railroad, Chicago, was seriously crippled on March 15 by an \$8,000,000 fire which wiped out the block of buildings surrounded by Jackson Boulevard, Van Buren, Canal and Clinton Streets. The Canal Street station of the elevated, which is located in the center of the block, was demolished and the platforms and ties set on fire by the collapse of an adjacent building.

The steel elevated structure and the canopy and platform on the north side suffered the most severe damage, because they received the full blast of the fire from the immediately adjacent burning buildings. The rails of the two north tracks were warped and the ties burned out so that the track was impassable. The intense and continued heat on that side caused several girders to sag, and in all about ten will have to be replaced as well as about 2,000 ties. The total damage to the "L" is estimated at between \$75,000 and \$80,000.

From 1 a.m., when the fire started, until 5 p.m. the same day trains of the Garfield Park, Douglas Park, Logan Square and Humboldt Park elevated lines and the Aurora, Elgin & Chicago Railroad were unable to come further toward the Loop than Halsted Street. However, passengers were brought to the Loop by routing all Metropolitan trains north from the Marshfield Ave. Junction to the Lake Street crossing

with the Oak Park Elevated, to which passengers were transferred and carried to the Loop on special trains. At 5 p.m. the two south tracks were repaired and direct loop service was restored. At present the Clinton Street or west end of the station has been arranged for temporary use with a runway from the street. Practically normal service is now being operated over three tracks.

While the firemen were still pouring water into the ruins three or four hundred men were at work replacing the charred ties and warped rails on the two south tracks. These, as was mentioned before, were made safe for travel at 5 o'clock the same day.

Will Consider New Wage Scale.—On April 1 the matter of a new wage scale



CHARRED TIES AND STRINGERS ON CHICAGO ELEVATED STRUCTURE

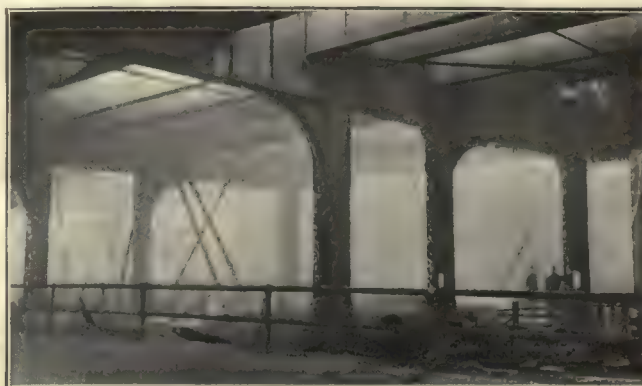
It will probably be impossible to place the fourth one in commission until the new steel girders are received and installed. Orders for this steel were placed by the engineers of the elevated road at 8 o'clock the morning of the fire.

The accompanying views give some idea of the extent of the damage and the measures taken to restore service.

for trainmen of the Seattle & Rainier Valley Railway, Seattle, Wash., will come up for settlement. The company has announced that on that date it desires to put into effect a maximum wage scale of 58 cents an hour, to replace the present maximum of 62 cents, which was adopted several months ago to serve as a temporary adjustment.



STRUCTURE CAUSED TO SAG BY INTENSE HEAT



WRECKAGE UNDER THE ELEVATED STRUCTURE

Pittsburgh Traction Plans Explained

President Thompson Addressing Chamber of Commerce Outlines Changes to Result from Reorganization.

In an address before the Pittsburgh Chamber of Commerce during the week ended March 11 A. W. Thompson, president of the Philadelphia Company, speaking on "Problems of the Pittsburgh Railways," assured members that the many traction lines in Pittsburgh will become one property eventually, through the new reorganization bond plan. One of the next big steps to be taken is the sale of \$5,000,000 of bonds in the Pittsburgh district.

He said a public utility must enjoy the good will of the public, for a banker and investor will not continue to invest or loan money to a company with which the community is unfair and upon which unjust burdens are placed. He said people willingly paid an increase in a few years from 5 cents for seats in "movies" to 10, 20, 30 and even 40 cents, and stood for a 40 per cent increase in steam railroad fares.

According to Mr. Thompson one of the big questions in the rehabilitation problem of the local railway was how to take care of various securities coming due, failure to meet any issue at maturity generally meaning foreclosure. It is proposed to provide for retiring these issues as they come due with a new class of bonds covering one property for the purpose of exchange with the old bonds. These new bonds are to be issued under a mortgage covering all the properties, which comprise more than 100 separate companies. As these various issues are exchanged for the new bonds the traction lines will become one property eventually.

Mr. Thompson said that for more than ten years active discussion of the railway subject has been before the Chamber of Commerce, mostly because of inadequate service. During this period \$750,000 had been expended in making reports, investigations and a valuation. Nineteen separate reports were made during this period, with the final result of receivership, four years ago. Inadequate service still prevailed. Because of the lack of co-operation between the management of the railways and the people of Pittsburgh, brought about through an absence of understanding of the difficulties, these difficulties gradually increased until the railways lost credit and were unable to finance improvements. In continuing Mr. Thompson said:

A live, modern public utility is one of the best assets of any community. A broken-down public utility, without funds to provide modern equipment and facilities, and without any means of financing, is a liability to any community.

You know as well as I do that the prosperity of any community depends in a large measure upon its transportation facilities. The prosperity of any community is, therefore, bound up with the ability of the street railways to render adequate service.

A proposition was made to the Mayor and City Council to join in a conference to see if something could not be suggested and started with a view to giving Pitts-

burgh the same type of service that the city was receiving from other public utilities which serve the community.

A contract was rounded out which had the semblance of being practical and could be put into effect. It soon was found that the most difficult problem was the question of credit; that without new capital for purposes of buying equipment and making improvements, as well as for general rehabilitation of the lines, a success of the transportation system was impossible.

The contract was changed somewhat, the results of which are shown in the approval of the contract by the Public Service Commission. I think the Mayor and the Council, with others of the present city administration are in earnest in making the new transportation company a success.

Some events in the affairs of the city stand out like milestones along a highway. This agreement seems to be one of those milestones. From every point of view it seems to be democratic, fair, reasonable, and, above all, hopeful for the future intercity transportation, as it aims to promote progress; it strives to lighten the burdens of the car rider; gives a square deal to the security holders, many of whom are Pittsburghers, as well as provides for thorough co-operation between the municipal officers and the railway officers.

The spirit of the Pittsburgh Railways agreement is the important thing. Words often fail to express the underlying intention. Difficulties may arise in the interpretation of the agreement, but if the people of Pittsburgh and the railways management always will remember that it was entered into in a spirit of co-operation and good will, and always strive to keep that spirit alive, all difficulties will be surmounted.

Here Mr. Thompson said that the financing of \$5,000,000 for extensions and improvements was the one step that remained in the closing of the contract with the city. It was absolutely necessary to secure this amount to make a success of the transportation system. It was proposed that this amount of bonds should be sold in the Pittsburgh community, and that the backing of the Chamber of Commerce, together with the backing of the various boards of trade, civic bodies, municipalities and others, be secured in order to effect a proper distribution of the bonds.

Mr. Thompson said that with the new franchise contract in force, many banks have stated their willingness to advise their patrons of the soundness of the bonds which it is proposed to issue. The securities to be offered will be in denominations from \$50 to \$1,000.

Important Questions Referred to Supreme Court

A number of questions affecting vitally utility valuations may be considered by the Supreme Court of the United States in the case of Georgia Railway & Power Company, Atlanta Gas Light Company, appellants, vs. Railroad Commission of Georgia, et al., appellees. A speedy hearing on this case has been urged by both parties.

The case mentioned is pending on appeal from the special tribunal of three judges from the Northern District of Georgia, being a suit in equity to restrain the Railroad Commission of Georgia from putting into effect an order reducing the rates for gas.

The questions involved in said appeal are as follows:

(a) Whether the State Railroad Commission, in fixing the present value of property, has the right to disregard the advance in value since 1914.

(b) Whether it is the duty of the State

Railroad Commission, in fixing the value of the property of public service corporations, to consider the value of the special franchises thereof.

(c) Whether the normal federal income tax should be included as part of the operating expenses of public service corporations.

(d) Whether the original cost of financing should be considered by public service commissions in fixing the value of the property of public service corporations.

The appeal to the Supreme Court, in which both sides join, declares that the matters involved are of great public interest, in that these same questions occur in a very large per cent of the cases before public service commissions, and the determination of these questions is of pressing importance not only to the public service corporations, but to the State as well. Again the inferior Federal Courts are not in accord in their answers to the questions involved. Finally, the appeal says, the Railroad Commission of Georgia has now pending before it a number of cases in which these questions are involved and it is of vital importance to this State tribunal that they should be speedily settled.

The assignments of error on which the company based its appeal were referred to in the *ELECTRIC RAILWAY JOURNAL* for March 4, page 380.

Strong Opposition Voiced to Maintenance by Taxation

The proposed plan of Councilman C. J. Erickson, which is to be presented to the voters at the coming city election, and which provides for the maintenance of the Seattle Municipal Railways by taxation, is meeting with widespread opposition among business men and taxpayers in the city. A body recently formed, known as the League Opposed to Maintaining Public Utilities by General Taxation, has opened offices at 303 Securities Building and is conducting an educational campaign against the movement. The campaign has been indorsed by the board of trustees of the Seattle Chamber of Commerce. The league has issued a statement calling attention to the fact that during 1922 it will cost approximately \$5,100,000 to maintain and operate the municipal railway lines.

Erickson claims that under his plan, which is guaranteed to reduce the fares to approximately 3 cents, there will be an increase in travel of at least 20 per cent, which, it is stated, means an increase of not less than 10 per cent in the operating cost. This means, according to the league, that under the Erickson system it will cost not less than \$5,610,000 to operate the lines in 1923. Even at the present cost, it is estimated that 21 mills will be added to the present total tax rate of 63 mills, making a minimum total tax in 1923 of 84 mills, and possibly more.

The league also estimates that if the Erickson plan is favorably voted at the city election it will mean the indefinite suspension of projected improvements totalling more than \$10,000,000 and will cut building operations 50 per cent.

Men Plan Wage Agreement at Schenectady

Delegates representing the employees of the electric railway companies of Schenectady, Rochester, Utica and Syracuse ended a two days' session at Schenectady on March 21 by completing the drafting of a blanket agreement governing wage scales and working conditions in the four cities. The tentative draft will be presented to employees in the several cities for amendment or ratification on the following dates: March 23, Utica; March 24 and 25, Rochester; March 27, Syracuse; March 28, Schenectady.

The board drafting the agreement will meet on March 30 at Syracuse to perfect the final draft by incorporating amendments which may be decided upon by the several locals. The amended agreement will be presented to the several traction companies April 1, and if accepted by the companies will be effective May 1, for a year. Officials attending the conference refused to make public the details of the agreement, but it is learned that it calls for the continuance of the present wage scale in each of the cities, 50 cents an hour in Schenectady and 52½ cents in the other cities. It is also stipulated that a higher wage must be paid the operator of one-man trolley cars. This type of cars is operated in Schenectady, Utica and Syracuse. No draft of changes in regard to working conditions was made, it is said.

Accident Bonus Starts for Georgia Railway

A bonus accident plan, whereby each trainman of the Georgia Railway & Power Company, Atlanta, will receive \$3 for each month in which no avoidable accident is charged against him, has been announced by F. L. Butler, general operating manager. The bonus, which is open to all trainmen, regular or extras, who work at least twenty-five days of the month is payable quarterly.

The company has classed all accidents as "A," "B" or "C." "A" accidents are those for which the trainman is not to blame, Class "B" accidents are those which could have been prevented by extraordinary care. The motorman must make allowance for possible carelessness of the other person and try thus to prevent the accident. This class of accident will not call for discipline, but will prevent the trainman from getting his bonus. Class "C" accidents include those for which the trainman was responsible. A "C" accident against a man will automatically prevent him from getting his bonus, and will carry with it demerits, suspension or dismissal.

The plan goes into effect April 1. In the booklet which introduces the plan to the trainmen certain types of "B" and "C" accidents are specifically mentioned. Some of these are collisions between cars, collisions at steam railway crossings, collisions with automo-

biles and other vehicles, collisions with pedestrians, motorcycles and bicycles, collisions with animals, horses, cows, mules etc., and derailments. They are in almost every circumstance to be held against the trainmen. The closed type of car practically eliminates accidents to persons boarding moving cars, or alighting from them. The trainman is held responsible to see that passengers do not board or alight from an open car while it is in motion. Accidents to persons boarding cars at rest or alighting from cars at rest are generally classed as "A" accidents, if the trainman shows that the car was at rest, and that he did not try to operate the door while passenger was boarding.

Bankers Indorse Certificates for Subway Construction

New impetus was given on March 16 to the proposal for municipal ownership of the surface and elevated railways of Chicago. On that date the report was presented from a committee of bankers on the "public utility certificates" proposed to be issued under the plan of Alderman Schwartz. This plan has been mentioned several times in the *ELECTRIC RAILWAY JOURNAL*. The companies had practically agreed to the proposition if a purchase price could be fixed and if the certificates were found to be salable. The bankers gave their indorsement, subject to court approval, to the certificates. They thought the certificates would be not only marketable but "attractive."

It is expected that negotiations with the companies will be resumed and if an agreement on other features of the plan is reached a court test will be made of the certificates. The opinion of the bankers stirred up considerable discussion because the faction led by Mayor Thompson has been contending that nothing can be done without legislation and that the only solution lies in the formation of a "local transportation district" with authority to impose and collect taxes for purchase of the properties.

Meanwhile the committee of engineers is working on plans for a subway system. It has been decided that this matter would have to be submitted to a referendum next June. The details of routes, etc., will be worked out during the next six months.

Pacific Railway Club Elects Officers

At the annual meeting of the Pacific Railway Club held in San Francisco, Cal., on March 11, the following officers were elected for a period of one year: President, F. S. Foote, professor of railway engineering, University of California; vice-presidents, J. N. Clark, chief of the Fuel Bureau of the Southern Pacific Railroad, and J. M. Yount, master mechanic of the Market Street Railway, San Francisco; treasurer, R. G. Harmon, chief clerk of the Western Pacific and Denver & Rio Grande road.

News Notes

Differences to Be Settled.—Conferences are taking place between representatives of the employees of the Scranton (Pa.) Railway and officials of the company over the matter of wages. The men have demanded approximately a 10 per cent increase.

Electric Cars to Carry Mail.—The postoffice department appropriation bill reported to the United States Senate by its appropriations committee provides \$700,000 for the inland transportation of mails by electric and cable cars.

Mr. Bemis Retained by Syracuse.—Announcement was made on March 11 by Mayor John H. Walrath and Frank J. Clegg, corporation counsel of Syracuse, N. Y., that Edward W. Bemis, Chicago, would be retained to aid the city in seeking to require the New York State Railways to reduce its fare from 8 cents and to discontinue use of one-man cars. The city will begin the presentation of evidence against the one-man car and for a reduction in fare on March 31 in Syracuse, the Public Service Commission having transferred trial of both cases from Albany to Syracuse in order to accommodate the city's witnesses.

Wants Wage Dispute Settled.—The London (Ont.) Street Railway employees' union has applied for a board of conciliation to settle a wage dispute under federal labor laws. The company enforced a wage reduction of 3 cents an hour on March 1. The men also formally lodged a protest with the department of labor against the action of the company, the claim being that the company should have itself applied for a conciliation board or awaited action by the men. The Ontario Railway and Municipal Board was previously asked by the men to restrain the company but that body ruled that it has no jurisdiction in wage disputes.

Mr. Beeler Retained in Richmond.—The members of the committee on streets of the Council of Richmond, Va., has recommended the retention of John A. Beeler, New York, as consultant in connection with its investigation of the local railway situation. The Council originally appropriated \$10,000 for an investigation. It then asked for bids from engineers. When the matter came up for discussion before the committee on streets of the Council there were many replies to the appeal of the Council. After the matter had been discussed it was found that the scope of the investigation as planned originally was too narrow to secure what was really desired, and the whole matter was considered again. In consequence it was decided by the committee that the sum of \$25,000 should be set aside to secure the study which is now deemed essential.

Financial and Corporate

\$9.19 a Share on Common Public Service of New Jersey Presents Very Encouraging Report—President McCarter Optimistic

The annual report of the Public Service Corporation of New Jersey and subsidiary companies shows net income, after charges and taxes, amounting to \$3,594,629. This is equivalent, after deduction of preferred dividends, to \$9.19 a share earned on the \$30,000,000 common stock, and compares with net income of \$2,218,408, or \$5.12 a share, earned in 1920. Details of the report are shown in the following table:

	1921	1920
Operating revenue.....	\$75,311,507	\$72,318,087
Other income.....	2,097,315	2,378,407
Total income.....	\$77,408,822	\$74,696,494
Operating expenses.....	51,769,627	52,638,939
Amortization charges.....	4,893,956	3,237,529
Net after taxes.....	\$20,745,237	\$18,820,026
Subsidiary companies' fixed charges.....	12,856,151	12,324,889
P. S. Corporation's fixed charges.....	4,294,458	4,276,729
Net income.....	\$3,594,628	\$2,218,408
*Preferred dividends.....	835,739	681,757
Common dividends.....	1,200,000	1,199,984
Balances.....	\$1,558,890	\$336,667
Miscellaneous debit.....	107,986	†18,658
Surplus.....	\$1,450,904	\$355,325

*Exclusive of that owned by Public Service Electric Company. †Credit.

In his remarks to the stockholders Thomas N. McCarter, president, says:

The company came through the year in a very satisfactory condition. Special attention is called to the amount of \$4,893,956, which is plowed back into the properties of the company through the amount set up for amortization charges. In addition thereto, a very considerable amount was carried to profit and loss account, over and above the sum disbursed for dividends. The future is full of promise. If the company is allowed to proceed in its great work of developing the State along the lines of its activities, without undue interference occasioned either by political agitation or unfair and ill-advised regulations, it believes it can perform a most useful service to the people of the State and yield to its security holders a reasonable return upon their existing and future investments.

Mr. McCarter says that the basic problem of wasteful jitney competition still remains unsettled in New Jersey, although nearly everywhere else it has been solved at least to the extent of the removal of useless competitive service upon the same streets. Although the financial condition of the railway company is already much improved and this improvement is expected to continue, it cannot function at its highest efficiency at a minimum fare so long as this destructive competition remains.

The plan put into effect during the year for selling the preferred stock to customers on the installment plan has been favorably received. The company intends to continue this method of distributing its securities. There has been sold at par an issue, chiefly in this way, of \$1,666,600 of 8 per cent cumulative preferred stock. In addition \$1,198,600 of the issue has been sold on

the instalment plan and partially paid for.

The directors of the corporation on March 21 increased the annual dividend rate from \$4 to \$6 by the declaration of a quarterly dividend of 1½ per cent on the common stock, payable March 31 to stock of record March 29. The \$4 rate has been paid since March, 1920.

Philadelphia Directors Organize

The present agreement of the Philadelphia (Pa.) Rapid Transit Company with Thomas E. Mitten has been renewed with compensation unchanged. He was also elected president and chairman of the board.

The by-laws of the company remain unchanged and an executive committee of five members has been elected by the board, with T. E. Mitten as chairman, the other members being W. C. Dunbar, who is also vice-president of finance and accounting; G. A. Richardson, also vice-president in charge of operation; H. G. Tulley, who represents Mitten Management in co-operative welfare matters, and C. J. Joyce, counselor.

The other officers elected by the board were E. L. Austin, comptroller; G. W. Davis, treasurer; F. B. Ellis, secretary, and W. D. Witt, auditor.

Brooklyn Outlook Bright

Protesting Figures in Commission Valuation Committee of Stockholders Sees End of Receivership

The protective committee of stockholders of the Brooklyn Rapid Transit Company made public on March 19 a letter to George McAneny, chairman of the New York Transit Commission, protesting against the valuation set upon the properties of that company and its subsidiaries by the commission.

The committee in this letter questions the authority of the commission to set a valuation of only \$154,000,000 on property in which it is said that \$238,000,000 had been invested, as the first step in its plan for a unified transit system, and charged the commission virtually with attempting to confiscate property by wiping out all equities.

The committee said that the city had flagrantly and deliberately violated its contract with the Brooklyn Rapid Transit Company, particularly by delay in the construction of the Fourteenth Street-East New York line, and served notice on the commission that it proposed to request Receiver Lindley M. Garrison to take immediate legal steps to recover at least \$20,000,000 for the city's alleged defaults under the contract.

The letter says at the outset:

When your commission promulgated the general outlines of its proposed plan of re-adjustment last fall, and this committee

was invited to express its views on some of the underlying principles, we gladly complied, and assured you of our co-operation. We endeavored, however, to impress upon you that any such plan as you were then contemplating, to be successful, must be predicated upon valuations which would be fair to all classes of security holders.

Your engineers state that they have endeavored to ascertain actual or original cost, and that, where this has not been ascertainable, they have "estimated" the same on various theoretical assumptions as to conditions under which the properties should have been constructed. Apparently, however, no real effort has been made to check the actual investment, especially with respect to the older properties.

In this manner an unfair impression has been given the public, and both your commission and the public may be grossly deceived thereby. We are advised by those who are familiar with the history and development of the properties that the actual investment exceeds \$238,000,000, the principal items of which are readily ascertainable and easily verified. This aggregate (including Brooklyn City Railroad for comparative purposes), we are advised, is made up of approximate amounts as follows:

1. Capital debt outstanding, consisting of bonds, notes, receiver's certificates and real estate mortgages, but excluding stocks.....	\$140,000,000
2. Cash paid in by stockholders of Long Island Traction Company (predecessor of B. R. T.).....	4,500,000
3. Cash expended by B. R. T. Company and represented by bonds, converted into B. R. T. stock, par for par.....	29,600,000
4. Cash realized from the sale of B. R. T. stock.....	4,600,000
5. Cash expended out of income and other sources for construction and equipment and not represented by any capital securities in the hands of the public, but mostly in unsold treasury bonds.....	23,600,000
6. Cash appropriated from earnings for additions and improvements against which no securities have been issued.....	5,000,000
7. Cash used to retire or withdraw bonds against which there are no securities outstanding in the hands of the public.....	3,000,000
8. Cash paid in for Brooklyn City Railroad stock.....	12,000,000
9. Cash and equivalents put into Brooklyn Union Elevated Railroad, Kings County Elevated Railroad, and Nassau Electric Railroad, prior to acquisition, less bonds outstanding at that time, this equity being now represented in stocks, at least.....	15,700,000
Total.....	\$238,000,000

It is explained by the committee that the total of \$238,000,000 does not include any value for franchises, nor does it include a large amount chargeable for interest during construction, appreciation of real estate over original cost and other items which would very substantially increase the above amount. The committee then explains that as opposed to this actual investment, which is \$10,000,000 in excess of the net capitalization of the B. R. T. system outstanding in the hands of the public Dec. 31, 1921, the engineers of the commission propose to allow, on the basis of their theoretical assumptions as to "actual" or "original" cost, only \$154,000,000, or a difference of \$84,000,000. The committee says that this recommendation is obviously so unfair as to afford no basis for discussion.

In continuing its comment the committee says:

In view of the conclusion which we have reached and already expressed, we do not propose to consider separately the valuations placed upon the properties of the subsidiary companies included in the foregoing aggregate. We cannot, however, refrain from emphasizing the very great in-

... which the proposed valuations do not take into account the rapid transit properties of the company, or the extension and equipment of which, in conjunction with the new city-built subway lines, approximately \$78,000,000 has been obtained from investors and expended since 1913.

The outstanding debt against these properties, including the underlying bonds, notes and bonds issued since 1913, with interest in default, receiver's certificates, tort claims and other obligations, is estimated at more than \$135,000,000, approximately \$78,000,000 of which has been expended since 1913 under the direct supervision and control of our commission or your predecessors in authority. To provide for this debt of more than \$135,000,000 your engineers recommend a valuation of approximately \$96,000,000, or \$39,000,000 less than enough to provide for the debt, thus eliminating completely all stockholders' equities in the properties.

In reaching this valuation your engineers have placed a net value of approximately \$2,400,000 on the company's extensive elevated railroad system in the Borough of Brooklyn, which was given an earning power under the contract with the city of \$500,000 per annum, which, capitalized at five per cent (the rate proposed under your plan), would support a value of at least \$10,000,000 for the property.

In conclusion the committee calls attention to the fact that the earning power of these properties has shown marked improvement during the current fiscal year. Conditions are beginning to return to normal. The average operating ratio (including taxes) of the surface lines has been reduced from 115 per cent in 1921 to about 78 per cent for the first seven months of the current year, and the operating ratio (including taxes) of the rapid transit lines included in the system has similarly been reduced from 94.43 per cent to about 75 per cent.

At present the B. R. T. system as a whole is earning full interest on its bonded debt, and the committee says that it is advised that there is a possibility of further improvement in the future. It is certain, according to the committee that as soon as the new lines which the city has not yet finished can be placed in operation the net revenues of the rapid transit system will be increased by a substantial amount, estimated at not less than \$1,000,000 per annum. It may, therefore, be predicted, says the committee, that at a not distant date, with the co-operation of the security holders, it will be possible to take the properties out of receivership and permit them, with credit restored, to render a still greater public service.

\$727,914 Profit in Winnipeg

Despite Adverse Economic Conditions
Winnipeg Electric Railway Again
Makes Encouraging Progress

At the annual general meeting of the shareholders of the Winnipeg (Man.) Electric Railway on March 10, the report of the president and directors and the financial statements for the year ended Dec. 31, 1921, were presented and adopted. The report of the operations for the year ended Dec. 31, 1921, follows:

Gross earnings from operations..	\$5,418,023
Operating expenses, before charging depreciation	3,559,380
Net operating revenue.....	\$1,858,643
Miscellaneous income	161,406
Income available to meet fixed charges, etc.	\$2,020,050
From which the following deductions are made:	
Interest charges on debenture stocks, bonds, gold notes, etc..	\$633,331
Extinguishment of discount on securities	52,526
City percentage and car license taxes	183,069
Taxes	164,315
Miscellaneous non-operating expenses	3,312
Other income deductions.....	54,532
	\$1,091,085
Net income as shown on accounts submitted herewith, excluding depreciation	\$928,964

The gross earnings for the year 1921 show an increase of \$184,323 over the previous year, and the net income shows an increase for the year of \$132,389.

The company has continued making extensive improvements, particularly in the rehabilitation of rolling stock, track and roadbed. Substantial extensions were also required to take care of the expansion of the electric utility business and there were also improvements at the gas works.

After payment of all fixed charges and making the usual provision for depreciation the company made a net profit of \$727,914. From this amount has been deducted the dividends paid on preferred stock amounting to \$182,367 and also an additional allowance for depreciation amounting to \$122,605,

leaving \$422,941 to be transferred to surplus.

The preferred stock recently authorized has all been marketed and the proceeds have been used to retire floating liabilities. President Nanton said:

The company has continued its policy of maintaining good relations with the public and has given wide publicity to the problems confronting it so that all patrons may be acquainted with the conditions surrounding the operation of the properties. Emphasis has been stressed on the company's desire to provide courteous and efficient service and the public appears to appreciate the sincere efforts on the part of the company to bring this about.

Washington Merger Bill
Reappears

Senator Ball of Delaware, chairman of the Senate Committee on the District of Columbia, has reported a bill previously introduced by him, authorizing the merger of certain street railways in the District of Columbia. In his report on the measure Senator Ball says that if the bill is enacted the railway situation in Washington will be greatly improved and simplified by operation of all the lines by one company. He points out that under the new system there will be no charges for inter-company transfers and that re-routing will be possible to the benefit of the car-riding public. Another advantage will be a saving in the operation of railways and a reduction in the coal bills, in addition to saving in overhead charges. Summarizing the benefits he says they will embrace "better service and lower fares."

Engineer Commissioner Keller of the District of Columbia Public Utilities Commission, in a letter to the Senator, recommends that there be not attached to the bill he has reported, which provides for taxing the surplus revenues of the car companies, a mandatory provision for a merger of the two lines.

Failing to secure authorization of the Utilities Commission to sell three tokens for 20 cents for both lines, the Citizens Association Federation has requested the commission to authorize this rate of fare on the Capital Traction Lines, on the ground that the company is now selling tickets fifteen for \$1.

	Latest	Month Ago	Year Ago	Peak	1913
Street Railway Fares*	March 1922 7.14	Feb. 1922 7.16	March 1921 7.21	May 1921 7.24	4.84
Street Railway Materials*	Feb. 1922 156	Jan. 1922 157	Feb. 1921 191	Sept. 1920 247	100
Street Railway Wages*	March 1922 214	Feb. 1922 214	March 1921 231	Sept. 1920 232	100
Steel (filled orders (Million tons)	Feb. 28 1922 4.14	Jan. 31 1922 4.24	Feb. 28 1921 6.93	Apr. 30 1917 12.18	5.91
S. Bank Clearings Outside N. Y. City (Billions)	Feb. 1922 10.16	Jan. 1922 11.58	Feb. 1921 10.43	March 1920 18.54	6.12
Business Failures Number	Feb. 1922 2,010	Jan. 1922 2,705	Feb. 1921 1,435	Jan. 1922 2,705	1,213
Liabilities (millions)	Feb. 1922 68.64	Jan. 1922 115.3	Feb. 1921 79.12	Jan. 1922 115.3	24.64

Conspectus of Indexes for March, 1922
Compiled for Publication in this Paper by
Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Peak	1913
U.S. Bur. Lab. Stat. Wholesale Commodities	Feb. 1922 151	Jan. 1922 145	Feb. 1921 167	May 1920 272	100
Bradstreet's Wholesale Commodities	March 1922 11.60	Feb. 1922 11.42	March 1921 11.87	Feb. 1920 20.87	9.21
Dun's Wholesale Commodities	March 1922 169.7	Feb. 1922 165.0	March 1921 181.9	May 1920 263.3	120.9
Annalist Wholesale food	Mar. 18 1922 182.6	Feb. 18 1922 173.2	Mar. 19 1921 193.6	June 12 1920 329.2	140
U.S. Bur. Lab. Stat. Retail food	Feb. 1922 142	Jan. 1922 142	Feb. 1921 158	June 1920 219	100
Nat. Ind. Conf. Bd. Cost of living	Feb. 1922 157.7	Jan. 1922 161.4	Feb. 1921 176.3	July 1920 204.5	(1914) 100

The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over, except New York City, and weighted according to population. Street Railway Materials index is relative average price

of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on street and interurban railways in the United States.

Valuations All Protested in New York

Tentative Figures Presented by New York Transit Commission as Basis for Negotiations in Pooling Arrangement Are Regarded as Ridiculously Low by Companies

The Interborough Rapid Transit Company, the Brooklyn Rapid Transit Company, the Manhattan Elevated Railway and the Third Avenue Railway notified the Transit Commission on March 20 that the valuations recommended by commission experts are too low to provide a basis for the inclusion of these roads in the citywide reorganization plan offered by the commission.

DISCLOSURE of the attitude of the companies took place at a hearing of the commission at which the forty companies involved in the reorganization project were requested to submit criticism of the valuations.

The total valuation of the forty companies was placed by the commission appraisers at \$465,680,154. This sum covered privately owned properties only and did not include the city's expenditure of approximately \$300,000,000 in subways. The figures were summarized in the *ELECTRIC RAILWAY JOURNAL* for Feb. 25, page 333.

The Interborough letter, requesting a redetermination of values by an "impartial board," said that the \$174,221,056 estimate by the commission appraisers fell far short of a proper allowance. Instead, the communication held, the present worth of the I. R. T. properties is at least \$300,000,000, while the commission appraisal "would not be sufficient to pay par on the outstanding bonds and notes, thus leaving nothing whatever for the stock."

In revising the I. R. T. valuations, at least in some particulars, the road seeks to have another board set the figure, pointing out that the commission should not do this, as "it is not consistent with fairness to permit a party to be the judge of its own case."

The communication from a committee of holders of Interborough-Metropolitan collateral trust bonds announced its disapproval of the valuations because they left nothing for I. R. T. stock, which is the security for the bonds in question.

In opening the hearing on March 20 Chairman McAneny pointed out that the proposed valuations are subject to revision if the commission comes to the belief that changes should be made.

The position of the bondholders of the Brooklyn Rapid Transit Company against the valuations was brought out in a communication presented by Paul D. Cravath. The contention on behalf of this company is referred to elsewhere in this issue. There was also a letter from Lindley M. Garrison, receiver for the Brooklyn system, in which he did not give his views for the reason that the receiver, only a temporary official, has no authority in the premises. In refraining from submitting criticism of the valuations Mr. Garrison said he felt this was his proper course, "however well founded the same might be."

The Third Avenue Railway submitted its answer in a letter signed by President S. W. Huff, who characterized the

valuation of its system as "absurdly low." The Third Avenue valuation by the commission experts was just under \$34,000,000, which, according to Mr. Huff's letter, is about half what it should be.

The attitude of the Manhattan Elevated Railway the lines of which are operated by the Interborough under a 999 year lease at a yearly rental of millions of dollars, was disclosed in a letter from President Alfred Skitt, who said the security holders would not accept the proposed appraisal of only \$57,374,205 as against a company book value of more than \$113,000,000.

The communication from Mr. Skitt characterized the Manhattan valuation as "grossly inadequate" and said that an attempt to take the property at that figure would amount to confiscation in violation of the rights of security owners. Terming the proposal of the commission to give quasi public bonds in exchange for the road "unsatisfactory," the Manhattan official said his company would require cash or its equivalent as compensation if the lines of that company were included under the unification plan which the commission has advanced.

Job Hedges, receiver for the New York Railways, the Interborough's surface subsidiary in Manhattan borough, sent a letter in which he said he had no authority in the valuations matter and, therefore, did not give his views. It was said that the problem was one for the security holders of the road to decide and a letter from them is expected to follow the lines indicated by the parent corporation.

In the course of its protest the Interborough Rapid Transit Company said:

The law authorizes the commission to value the property at the "fair reconstruction cost of the property less depreciation." It is respectfully submitted that the fair reconstruction cost of the property contributed by this company to the development of the new subways and elevated improvements would be at the present time a sum equal to at least 115 per cent, of the net cost in money just as the contract contemplates, and that after making reasonable deductions for theoretical depreciation, if any, which is not conceded, and discount, the sum remaining would be in excess of the par of the outstanding bonds and notes issued by the company to aid the city in its rapid transit projects of 1913.

To ask investors who within the past three years have bought \$38,144,400 of the company notes, and within the five years prior to that bought \$162,106,000 of bonds, to accept less than par and interest savors so much of repudiation by the city of New York that it is inconceivable that the commission will find itself able to adopt the valuations its bureau placed upon the property provided under the contracts of March 19, 1913.

From the foregoing it appears that the present value of the property in question is at least \$300,000,000 instead of \$174,-

221,058 reported by your bureau of valuation. Other assets not appraised by your bureau, but which are represented by the capital stock of the company increase the present value of the entire assets of the company to a sum greatly in excess of \$300,000,000. Yet your reported valuation would not be sufficient to pay par on the outstanding bonds and notes, thus leaving nothing whatever for the stock.

The letter from the Interborough Metropolitan bondholders, signed by Grayson M. P. Murphy, chairman, said:

We regret to find that none of the valuations of the properties of the Interborough and the Manhattan companies proposed by your valuation bureau would furnish a basis for the issue of sufficient securities to protect present holders.

Connected indirectly with the valuation and the fare matters in New York is the question of the attempt by the Interborough to secure changes in the terms of the lease under which the Manhattan Elevated Railway is operated by the Interborough. Seven per cent per annum is guaranteed by the I. R. T. on the stock of the Elevated, which has come to be regarded as a white elephant. Alfred Skitt, president of the Manhattan Railway, and George Welwood Murray, its counsel, as well as James L. Quackenbush, counsel of the Interborough, said a few days ago that there had been no new developments in the situation. It was learned that an almost daily interchange of views was being made between officials of the companies and the committee of security holders of the Manhattan Railway, of which Alvin W. Krech is chairman.

An authority who refused to permit his name to be used said:

The Manhattan Railway is not the only obstacle. The Manhattan is willing to make concessions, but the other side must make concessions, too. The matter of scaling down the 7 per cent stock guarantee is not to be the only basis of change. The Interborough has made millions out of this lease and has found it to be profitable. In the situation demands change, the entire burden is not going to fall upon the Manhattan stockholders.

It was reported that the Interborough would like to have the 7 per cent reduced to 4½ or 5 per cent, but it was said that this would not be likely to be satisfactory to all the Manhattan stockholders. The records of the Transit Commission show that on June 30 last the following were among the large stockholders:

Jay Gould estate, \$8,130,100; H. J. Cammann, \$2,289,000; General Education Board, \$1,451,400; Bertrand Cutler, \$1,144,000; University of Chicago, \$1,100,000; J. M. Amory & Son, \$1,000,000; Rockefeller Foundation, \$990,000.

Tentative Agreement Reached

General Manager H. H. Couzens of the City of Toronto (Ont.) Transportation Commission has reached a tentative agreement with the union under which the prevailing rate of wages will be maintained for another year. The men's request for two weeks' holiday with pay was not given serious consideration. The wage schedule of the commission gives car men 55 cent an hour for the first six months, 57 cents for the next three months and 60 cents an hour thereafter.

Termination of Receivership in Sight

Early release of the receivership under which the Des Moines (Iowa) City Railway has been operating since 1919 was hinted at recently when Judge Martin J. Wade of the federal court signed an order at Ottumwa permitting the company to exercise its corporate powers to borrow money with which to pay its debts. The court order was in response to an offer by the company to assume and pay the debts incurred by the receivership and also to pay some of the long past due accounts of the company itself, if it were again placed in control of its own property and the receivership lifted.

The offer states that the company in the strength of the franchise granted Nov. 29, 1921, has arranged to pay its debts if it can now get its property under its own control. According to the offer it is proposed to liquidate approximately \$1,000,000 at this time by means of long term notes. The company agrees in its offer to assume, as part of the receivership expenses, the bill for the cost of the special franchise election and the advertising incident to it. It also announces that it has arranged with the holders of the debentures now outstanding to accept the company's promissory notes in lieu of claims for interest on the debentures, and that it has arranged for an extension of credit on the notes held by those creditors whose claims are most pressing. Among these claims is one of the Harris Trust & Savings Company for \$58,182, one of the Western Water, Light & Traction Company for \$332,497. W. Harris and others hold personally notes aggregating \$161,951.

Judge Wade's order allows the Harris Trust & Savings Bank, the North American Railway Construction Company, the receivers and intervenors, including the city, until March 23 to file objections to his accepting the offer, and permits the company in the meantime to proceed with its arrangements to credit to fulfill its agreement.

Deferred Dividends All Paid

The last of the deferred dividends on the common stock of the Montreal (Que.) Tramway will be paid on March 28. The next regular dividend will be on May 1. Dickinson & Walbank, who specialize in the stock of the company, say:

The repayment of 17½ per cent deferred dividends (deferred before the new franchise had demonstrated its present satisfactory characteristic) is, we believe, unique in Canadian stock market history. No doubt the thirty-odd years of uninterrupted dividend payments had a sentimental influence upon the broad policy of repayments adopted by the administration. Twenty-four months the company has been in dividends an aggregate of 37½ per cent on the stock, or 18½ per cent per annum. This achievement has two-fold significance. It demonstrates remarkable earning capabilities; and it indicates, better than words, the liberal dividend disposition of the board.

With all the deferred dividends paid off, we now can look forward to the terms of the prospective new capital stock issue, which we anticipate will be on a basis to

represent from \$10 to \$12 per share on the stock.

Tramways stock is quoted at 146 to 147, at which price the 10 per cent dividend will yield 6.80 per cent per annum.

For a full-year period from date, purchasers before the close on March 20, should receive an aggregate return approximating 15 per cent on the investment, and henceforth for thirty-one years, or more a return of at least 6.80 per cent per annum.

\$247,132 Net in Honolulu

The Honolulu Rapid Transit & Land Company, Honolulu, Hawaii has reported gross earnings for 1921 amounting to \$960,992 with operating expenses at \$635,998 against \$580,028 in 1920.

According to the manager this advance in expenses is due to higher wages paid and a greater number of car miles operated. The net earnings were \$247,132, an increase of \$48,264 over those of the previous year. The company carried 19,202,083 passengers during 1921 of which 4,215,819 were transfer passengers. The total passenger traffic shows an increase of 25 per cent over 1919 and an increase of 12½ per cent over 1920.

Holding Company Sells Stock

The United Light & Railways Company, with headquarters in Grand Rapids, Mich., between October, 1920, and October, 1921, sold more than \$1,000,000 of its 7 per cent prior preferred stock to 3,733 subscribers or customers in the seventeen different communities served by its subsidiary companies. The company operates in Iowa, Illinois, Indiana, Michigan and Tennessee. The stock was first offered on Oct. 1, 1920, to employees of the company. The response was very gratifying. Employees of three operating companies subscribed 100 per cent, six showed percentages ranging from 91½ to 99.2, and one electric railway took 82 per cent. The stock was then offered to the public through employees of the company for cash at par or on the installment plan with a payment down of \$10 and installments of \$7.50 per month, plus interest on the unpaid balance.

Schools of instructions were conducted for the employees to familiarize them with stock selling methods. After the team organization had been maintained for about three months, it was decided to organize a separate department of the company to be known as the securities department. Prizes were offered for the best records.

The plan followed was to take a list of the lighting and power customers in the city concerned and to have a committee of employees having the broadest acquaintance among the customers eliminate names of those who probably would not be interested. Then the others were seen personally. The company agrees to take back stock for resale, but does not guarantee to sell it at par. The salesmen were instructed to sell stock only to those who expected to be able to keep it as a permanent investment. In connection with the sale a newspaper advertising campaign was conducted.

Court Approves Bond Payment by Receivers

Receivers Fagan, George and Tone of the Pittsburgh Railways have been directed on petition of President Thompson of the Philadelphia Company, holding company of the traction concern, by the United States district court to file a report on the receivership not later than April 1. This is the first legal step toward reorganization of the railway in accordance with the contract between the city of Pittsburgh and the Philadelphia Company.

The court at the same time, taking up two other angles of the situation, confirmed absolutely the 1921 accounting of their stewardship of the Pittsburgh Railways filed by the receivers, and approved the settlement, at more than \$1,000,000, which former Judge Henry G. Wasson, as master, recommended the receivers should make with the Southern Traction and United Traction companies, two of the three big underlying companies of the Pittsburgh Railways for bond and mortgage interest payments, these questions had been in litigation several years.

The Southern Traction and United Traction settlements, as recommended by former Judge Wasson, as master, proposed to pay the trustees of mortgages held on the lines of the Southern Traction Company, the West End lines, \$700,000 in interest, less \$100,000 already paid on account; \$75,000 to the Union Trust Company, trustee under these mortgages, for service and expenses, and to the holders of bonds of the United Traction Company, \$480,400, as interest. The total payments recommended, and approved by the court, are \$1,155,400.

This settlement disposes of a threat, in the case of the Southern Traction Company, to foreclose on its mortgages on the properties, take the West End lines out of the Pittsburgh Railways system and operate them separately.

Utah Property Lists Assessment Charges

The Salt Lake & Utah Railroad, Salt Lake City, Utah, has made its report for assessment purposes to the Utah state board of equalization, showing a total this year of \$2,087,591. Last year the company paid taxes on a valuation as finally fixed by the state board of \$2,397,905. The state board will revise and probably amend the figures presented this year. The main reduction in values claimed by the company is in that given to trackage and right-of-way, which the company says is worth this year \$1,520,700, of which \$868,980 is in Utah County and the remainder in Salt Lake County. Last year the company paid taxes on \$1,837,710 under this heading, \$1,034,300 being in Utah County. The company enters a value of \$100,000 for its franchise, but explains that it is not claiming this amount, and has doubts as to its legality, but is willing to let the figure of last year stand.

Bondholders Promise to Rehabilitate

No bids were received by Receiver George Whysall on March 18, when the properties of the Springfield, Troy & Piqua Traction Company were put up for sale the second time at the courthouse in Springfield, Ohio. As a result, announcement was made by Judge Merle N. A. Walker, Indianapolis, and G. L. V. Emerson, Chicago, representing the bondholders, that the bondholders will proceed at once to carry out the original agreement with the court to take steps to rehabilitate the properties. The line which runs between Springfield and Troy, has not been in operation for several months, except for a shuttle car operated between Springfield and Maitland, a distance of 2 miles, for the benefit of employees of the Victor Rubber Company. With the announcement of the bondholders, however, it is expected that service will be resumed within the near future.

Judge Walker announced that definite action would be taken within the next thirty days. Judge Walker, who is a brother of Guy M. Walker, New York City, trustee for the bondholders, said that he had been called into the case recently and that after a thorough investigation he found citizens of Springfield and other communities on the line were doing their part in the attempt to save the road. These citizens raised a fund of \$75,000 in return for which they were to receive bonds to that amount. However, after this fund had been raised, no action could be secured on the part of the bondholders and so the first sale of the road to the bondholders for \$300,000 was set aside by the court and the property ordered to be again offered at public auction March 18.

The upset price for the property was fixed by Judge John E. Sater of federal district court at \$135,000. The receiver was ordered by the court not to consider any bid under that figure and also to require a cash payment of \$25,000; one half of the remainder in thirty days and the other half in sixty days.

Reorganization Being Planned

Plans for the reorganization of the Syracuse & Suburban Railroad, Syracuse, N. Y., recently purchased by a committee representing the bondholders is soon to be laid before the Public Service Commission for approval. The financial end of the reorganization provides for the issuance of \$750,000 of income bonds. The new company will also issue \$300,000 in common stock. The new corporation will be known as the Syracuse & Eastern. The outstanding bonded indebtedness of the old company was \$550,000.

It is expected that a new manager will be appointed for the road as C. Loomis Allen, former vice-president and general manager, is now president of the L. R. Roberts Typewriter Company, Stamford, Conn.

Financial News Notes

Noteholders Depositing Their Securities.—The holders of 90 per cent of the three-year gold notes of the American Railways, Philadelphia, Pa., due on Feb. 1 last, have deposited their notes for extension of three years.

H. C. Beatty a Director.—Harold C. Beatty has been appointed a director of the Syracuse-Northern Railway, Syracuse, N. Y., succeeding Ernest I. Edgecomb, who resigned upon election to the bench of the Supreme Court.

Common Stock Dividend Passed.—The Porto Rico Railways, Ltd., San Juan, Porto Rico, which controls the Porto Rico Railway, Light & Power Company, has passed the dividend on the common stock, due at this time. The rate during 1921 was 1 per cent quarterly.

Loan Secured.—The Eighth Avenue Railroad, New York, N. Y., has secured a new mortgage loan of \$800,000 from the Farmers Loan & Trust Company. The proceeds will be used for improving the block front on the west side of Eighth Avenue between Forty-Ninth and Fiftieth Streets and for other corporate purposes.

Interurban Sold to Representatives of Bondholders.—R. M. Stinson and Thomas Conway, Jr., of Philadelphia, representing eastern bondholders, have purchased the Aurora, Elgin & Chicago Railway at foreclosure sale in Wheaton, Ill. on a bid of \$1,000,000 above their holdings, which consist of \$4,735,000 refunding mortgage bonds.

Application for Lease Before Commission.—The application by the Easton Transit Company and the Lehigh Valley Transit Company, operating in Allentown, Easton and Bethlehem, for the approval of a lease of all the property and franchises of the former corporation by the latter, is being considered by the Public Service Commission. The lease is for ninety-nine years, and stipulates the lessee must carry out all the obligations of the lessor.

Bondholders Organize to Protect Valuation.—A committee has been formed to represent bondholders of the Columbus & Ninth Avenue Railroad, New York, N. Y., and it is urged that holders of the bonds deposit them with the Columbia Trust Company before April 1, on or about which date hearings of the Transit Commission regarding the valuation of this and other traction properties is to take place. The committee states that in its opinion the valuation prepared by the Transit Commission is too low.

Sale Approved.—The sale of the defunct Sandusky, Norwalk & Mansfield Electric Railway, Norwalk, Ohio, to the Wilkoff Company, First National Bank

Building, Pittsburgh, Pa., has been approved by Judge J. M. Killets of Toledo. The approval is conditional on protests that may be filed within ten days. A certified check of \$10,000 was deposited by the Wilkoff group, recently, with G. Ray Craig, Norwalk master commissioner of the railway. The price of the property fixed by the federal court is \$60,000.

North American Company Dividend Policy Announced.—In order to clear up any uncertainty respecting the dividend declared on Feb. 28, the North American Company, New York, N. Y., has issued the following statement: "The dividend was a quarterly dividend of 2½ per cent payable April 1, of which 1½ per cent is payable in cash and 1 per cent in preferred stock. The 1 per cent payable in preferred stock was not an extra dividend and the company expects to maintain dividends on its common stock at the rate of at least 2½ per cent quarterly in the future."

Supplementary Opinion in Columbus Case.—In a supplementary opinion by Judge Kinkead of the Court of Common Pleas of Franklin County, Ohio, on the final entry and judgment in the Columbus Railway, Power & Light Company suit against the Clarks, judgment for the whole amount of \$1,079,726 is rendered against C. M. Clark and E. V. Clark & Company, jointly and severally. Secondary liability has not been found against other members of the board. The items included in the judgment were reviewed in the account of the decision of the court which appeared in the ELECTRIC RAILWAY JOURNAL of Jan. 28, page 168.

Sale of Lafayette Property Approved.—Judge A. B. Anderson in the federal court at Indianapolis has approved the sale of the Lafayette (Ind.) Service Company's property which was held by Lafayette as the result of foreclosure proceedings brought by the Real Estate Trust Company, Philadelphia, as trustee on behalf of bond holders. The court set March 31 as the date on which the transfer of the property should be made to the purchasers. R. W. Leving, of Lafayette, has been acting as receiver of the company. The details of the sale were recorded in the ELECTRIC RAILWAY JOURNAL of March 1, page 423.

\$30,000,000 in Bonds of French Company.—Kuhn, Loeb & Company are offering \$30,000,000 of a \$40,000,000 issue of 6 per cent external sinking fund gold bonds of the Paris-Lyons-Mediterranean Railroad. They are offered at 105 to yield 7.35 per cent to the date of maturity, which is Aug. 15, 1958. The entire issue may not be redeemed before Feb. 15, 1932, and if called then the yield gradually increases to a maximum of 8.78 per cent. If any bonds are redeemed by the sinking fund on Aug. 15, 1929, the yield reaches a maximum of 9.22 per cent. The proceeds are to be used for purchasing rolling stock, for electrification of several lines and for other improvements.

Traffic and Transportation

Connecticut Fares Again Problem

Commission Seeking to Determine What Shall Be Done Following Close of Five-Cent Trial Period

Hearings are being held by the Public Utilities Commission of Connecticut in various parts of the State to inquire into the fare situation on the lines of the Connecticut Company. It will be recalled that tests with a radial 5-cent fare are in progress in Bridgeport and Norwalk for trial periods under the commission's rulings. It is with the end in mind of determining what shall be done in the future that the commission met in Norwalk on March 21 and Bridgeport on March 22.

At the hearing in Bridgeport Mayor Fred Atwater and members of the mayor's transportation committee asked that the present radial 5-cent fare be continued, with the benefits of a reduction through the token system to be allowed for riders in communities on the outskirts of Bridgeport.

Judge Carl Foster appearing for the Manufacturers' Association, Chamber of Commerce, Business Men's Association and various organizations in Bridgeport, Fairfield, Stratfield and Stratford, asked for a unit 5-cent fare within the limits that were established in the old 10-cent fare, with a 2-cent transfer.

President Lucius S. Storrs of the Connecticut Company briefly stated that the company was not "earning enough to function in civic growth and civic necessity," and claimed that a comparison of revenues under the 5-cent fare with revenues last year meant nothing because jitney competition had been reduced in the meantime. He said that "until the time comes when the transportation corporation can be delegated for the sole medium of transportation, the community must suffer through higher fares."

The financial statement of the company for the period of the test fare, read into the record of the hearing by Chairman Higgins follows:

GROSS OPERATING REVENUE	
November	\$52,911
December	166,475
January	164,906
February	146,396
Total	\$530,688
OPERATING EXPENSES	
November	\$55,139
December	165,084
January	146,666
February	130,849
Operating expenses	\$497,738
Taxes	20,464
Total	\$518,203
Net operating income	\$12,485

For the period from Dec. 1, 1920, to March 1, 1921, the gross passenger

revenue of the company on the Bridgeport lines amounted to \$427,930 as compared with \$463,881 for the period from Dec. 1, 1921, to March 1, 1922. During the former period the flat 10-cent fare was in effect and the trolleys were in competition with unregulated jitneys.

The representatives of the public in attendance at the meeting in Norwalk all pleaded for a continuation of the 5-cent fare on the experimental 1-mile shuttle line and its extension to all of the local lines.

Chairman Higgins prefaced the hearing with a reading of the financial statement of the company for the Norwalk division from Nov. 6, when the 5-cent fare was put into effect on the West Avenue line, until Feb. 28. This statement follows:

GROSS OPERATING REVENUE	
November	\$17,931
December	24,952
January	25,061
February	23,140
Total	\$91,084
OPERATING EXPENSES	
November	\$17,217
December	20,667
January	19,237
February	17,499
Total	\$76,670
OPERATING INCOME	
November*	\$370
December	2,888
January	4,912
February	4,836
Total	\$12,266
*Deficit.	

President Storrs declared that figures were not available for the new lines on which it was sought to make a test of the 5-cent fare, but he declared that he doubted if it would be a success because most of the lines were in sections thinly populated and there would not be the possibility of increasing the revenue through very material increases in traffic.

Special Car Charges Increased

The Pennsylvania Public Service Commission has received a new schedule of passenger tariffs effective April 15, 1922, from the Scranton, Montrose and Binghamton Traction Company, operating between Scranton and Montrose. In the schedule filed the special car charges increased are as follows:

One-way extra car attached to regular increased from 80 cents to \$1.00 per car mile. Minimum charge from \$12 to \$20. Round trip extra minimum \$12 to \$25. One-way special car from 80 cents a car mile to \$1.50 a car mile for all distances in excess of 10 miles. Minimum charge increased from \$15 to \$25. Round trip special car is increased to \$1.00 car mile with minimum charge at \$30.00. Minimum charge for running cars beyond scheduled destination is increased from \$5 to \$10 and the rate is changed from \$5.00 per hour to 80 cents per mile.

Washington Fare Troubles Again

Associations Demand a Twenty-Cent Rate for Three Tickets as Well as Forty-Cent Rate for Six

Although the Public Utilities Commission of the District of Columbia established a new rate of fare in the National Capital effective on March 1, there is continued agitation over the fare question. This is due to the demand of various citizens' associations that the public be allowed to purchase three tokens for 20 cents, contending that some persons are unable to purchase six for 40 cents, and have to pay the 8-cent cash fare. The Citizens' Association Federation petitioned the commission to establish this 20-cent rate, but it has been held in abeyance by the commission to see how the present fares operate on the company's revenue. The Washington Railway & Electric Company opposed the three for 20 plan on the ground that it would reduce its revenues this year by \$100,000. It suggested in lieu of all present fares a straight fare of 7-cents cash.

Because of the disparity in revenues of the two companies operating in Washington, the Washington, Railway & Electric making less than the Capital Traction Company, Congressional committees on District affairs are considering a tax proposal to equalize the revenues of the companies by imposing a graduated tax on their revenues. The matter was the subject of a hearing Monday before the Senate District Committee, at the request of the Capital Traction Company whose revenues would be more largely affected. A bill for merging the companies has again been introduced, as noted elsewhere in this issue.

Prepare for One-Man Cars

While citizens of Joliet, Ill., were storming against the installation of one-man cars by the Chicago & Joliet Electric Railway, city officials practically agreed that it would be impossible, except by expensive litigation, to force the company to keep to two-men service. At the same time, employees signed an agreement accepting the new type of car and providing an increase in pay of 5 cents an hour for operators.

The following wage scale will be made effective according to the agreement:

	Cents an Hour
City lines	55
Lockport and Lyons	57
EXTRA MEN	
First three months	57
First nine months	53
One year	55

The agreement also states that the employees who operate one-man cars will be paid for 15 minutes time in which to get their cars ready.

Petitions have been circulated requesting the City Council to re-enact the two-man car ordinance.

Service Withdrawn in Augusta

Failure of the City Council to Regulate Unfair Jitney Competition Prompts Local Railways to Withdraw All Cars from Service

Electric railway service was suspended in Augusta, Ga., on March 16. It was still suspended on March 24. More than likely the cars of the Augusta-Aiken Railway & Electric Corporation will remain in the carhouses for some time to come, for on the evening of March 21 the Council of Augusta, ignoring the demands of all the constructive forces in the city, decided by a vote of thirteen to six to stick to its action of March 6 in refusing to grant relief as requested by the railway from the unfair, unregulated jitney competition.

AFTER the meeting of the Council on March 21 the company had nothing to say. There really was no statement for it to make. The officers had previously outlined their position at considerable length, and as long as the Council remains obdurate and refuses to heed the plea of the company it must of necessity stick to the course upon which it has entered.

NEGOTIATIONS BEGUN LAST FALL

Negotiations looking toward a settlement of the matter started last fall. According to the Mayor, the Council will so regulate the jitney traffic as to prevent congestion on any street occupied by the railway and will agree not to permit any jitney to take on or discharge passengers on any street occupied by the railway if the railway will reduce its fares to 7 cents and continue to transport school teachers and school children at 5 cents and maintain a fifteen-minute headway on all city lines.

The Mayor feels that the offer of relief proffered by the Council in its resolution of March 6 is as far as that body can go.

This does not satisfy the company. Its position is plain. It is not antagonistic to a jitney service or to jitneys. It has stated publicly that a jitney line properly regulated as a public utility on streets not already occupied by trolley lines and one or two blocks removed therefrom would confer upon the public a new and real transportation service. Then each line would serve the riding public without very material interference with the other within the zone of its own operation, and the public would have two efficient and properly regulated public carriers.

For more than three months the company, backed up by the leading citizens of Augusta and by every civic body in the city, has been appealing to the City Council to recede from what the railway submits is a suicidal policy, taken in heat, and now seen to be fatal to the public service of the electric railway company.

COMPANY ADOPTS CONCILIATORY ATTITUDE

In a final effort to induce Council to keep the jitneys off the streets occupied by the car lines and forbid them to take on or discharge passengers within two blocks of the company's lines, the company agreed, if Council would do this, to concede a 7-cent fare to the general public, a 5-cent fare to school

children and teachers, and require a 10-cent fare to the casual rider only, who fails or refuses to buy tokens at 7 cents in multiples of five or more.

This proposition was agreed upon between the company and the sub-committee of the general jitney committee of Council, and was reduced to writing in the shape of a letter addressed by the general manager to the sub-committee.

The sub-committee presented this letter to the general committee with the recommendation that the proposed agreement contained therein be reported to Council for adoption. But the general committee declined to do so and instead adopted a report that Council require as a condition precedent to any regulation of the jitneys a 7-cent straight fare for the general public, including the casual rider, and a 5-cent fare for school children and teachers, the city to "keep the jitneys off the streets now occupied by the street railway lines, with permission to cross intersections at which points they are not to take on or discharge passengers."

The jitneys committee made its report to the City Council March 6, 1922, setting forth its recommendation, as above outlined.

Thereupon the City Council passed a resolution adopting the report of the general committee as its final action, discharged the committee, and ordered the company be given one week within which to accept the city's proposition. While under this proposal the jitneys would not be permitted to take on or discharge passengers on streets occupied by the railway, or at the precise point of intersection of streets cross the same, they would be permitted to take on and discharge passengers anywhere else on all cross streets, even though it be within a few feet of the intersecting streets. The contention of the railway was that this practically defeated the very purpose of any regulation. Anxious to reach an agreement with the Council, however, the company finally signified that if Council would pass the resolution at once, the company would try to operate with the jitneys removed only one block from its lines.

In the meantime, however, the Council as noted previously had passed a resolution adopting the report of the general committee as its final action, had discharged the committee and ordered that the company be given one week in which to accept the city's proposition. The reply of the company

to this notification received on March 8 was to the effect that "the company could not under the terms proposed earn even its operating expenses, and, therefore, must decline the city's proposition." At the expiration of the time limit set by the Council for acceptance of the proposal of that body the railway withdrew service as its answer to the ultimatum of the Council.

These briefly are the happenings which have shaped the course of recent events. They are all bound up, however, with the situation that developed as a result of the war. At first the Railroad Commission allowed the company a 6-cent fare, and then to avoid disaster, it allowed a 7-cent fare; and although by the actual trial, it was demonstrated that the company was in sore straits the commission, doubtless hoping for some improvement, refused a higher rate than 7 cents.

Thereupon, the company, alleging that the rate allowed by the commission was so low as to be confiscatory, applied to the United States courts to enjoin the commission from enforcing the rate which it had fixed and to allow the company to put in a higher rate. After a hearing in this high tribunal, at which the fact was disclosed that the receipts under a 7-cent fare failed to yield even operating expenses, the court authorized the company to put in a fare not exceeding 10 cents per ride. The company, however, adopted an 8-cent token fare for the general public, a 5-cent fare for school children and teachers and a 10-cent fare for the casual rider only, who might not desire to buy tokens.

It was hoped by the company and doubtless by the courts, that this increase would produce a revenue sufficient to enable the company to continue service without falling below the actual cost of operations, disregarding for the present, all consideration of any return upon the investment.

The city at once adopted measures that called into existence a competitive jitney service, and so encouraged and fostered it that between a third and a half of the revenue normally and legitimately flowing into the railroad has been taken away from it.

The bulk of the riding that is being done by the public in Augusta is on the jitneys, although private automobiles are helping out by giving lifts now and then. In an effort to alleviate the situation as far as possible, the Council has attempted to direct by ordinance the distribution of the existing jitney service.

The constructive elements in the community are of course in sympathy with the railway. They deplore the unfavorable attention which the withdrawal of service has attracted to the city of Augusta.

The suspension of service is particularly unfortunate for the employees, inasmuch as it has been impossible for the company to absorb any of the railway help into other departments.

Fare Increase Denied I. R. T.

New York Rapid Transit Line Had Asked Commission for Temporary Rate Pending Settlement of Permanent Fare

The Interborough Rapid Transit Company, New York, has been denied an increase in fare. This action was taken by the New York Transit Commission following the signing of the Simpson-Jesse bill by Governor Miller on March 23. There was nothing else left for the commission to do under the circumstances, even if it had been kindly disposed toward the appeal of the railway for relief, for the new bill, which amends the transit act of 1921, forbids any increase of fare to any company which refuses to come into the proposed unified system under the Transit Commission's reorganization plan.

Another amendment to the transit act signed by the Governor gives the Transit Commission the right to order the operation of cars over lines of other companies. This is an emergency bill calculated to correct the situation which might arise should the Interborough Rapid Transit Company and the Manhattan Elevated Railway come to the parting of the ways over the matter of amending the lease between them, now considered by the I. R. T. to be unduly burdensome.

The Interborough Rapid Transit Company, through its counsel, George A. Quackenbush, has appealed to the Governor for a hearing on the bills. To this appeal the Governor replied:

I am surprised to learn of your action in filing a petition for an increased fare at the very time when you were asking me to withhold approval of a bill to prevent increases of fare fixed by contract, franchise and the like, except as a part of or as provided by the plan of reorganization. I do not share your fears either that the hands of the commission will be improperly tied or that any cloud will be put on the securities to be issued. I take it for granted that before the final consummation of any plan and the actual exchange of securities thereunder it will be necessary to secure a final adjudication of the validity of the plan. The act undoubtedly ties the hands of the commission to the extent of preventing increases of fare of companies refusing to come in under the plan. That is precisely what was intended.

The application was for an "immediate, reasonable, temporary increase in the existing rates, fares and charges, pending a final determination." It was made to the Transit Commission at its hearing on March 22 by Frank Hedley, resident and general manager of the Interborough Rapid Transit Company. He application said:

The Interborough Rapid Transit Company alleges that the maximum fare of 5 cents, now chargeable by it has been for more than three years, and now is, insufficient to yield reasonable compensation for the service rendered, and has been and is unjust and unreasonable.

The Interborough's fare application pointed out that final adoption of the commission's plan for the unification of the transit lines in New York will consume considerable time, and therefore requested the commission to fix a rate that will yield a reasonable average return on the property actually used by the Interborough. In addition to

this request the Interborough asked for the immediate temporary increase.

To support this contention the application set forth that the Interborough's property was valued by the Transit Commission's own bureau on Jan. 30, 1921, at \$228,515,261. The Interborough claims that its property is worth \$300,000,000. After showing its return for the years 1918-21, the application alleged that a reasonable average rate of return on its property would be at least 8 per cent a year. Its present return and for the past four fiscal years, has been insufficient to procure a return of 8 per cent, the application said.

When the application had been presented, Clarence J. Shearn, counsel for the commission, advised the commission to reject it on the ground that it had no relation or relevancy to the present proceedings. George McNeny, chairman of the commission, said the commission would take notice that the application had been presented and have it filed with the secretary.

It was further alleged in the application that to provide

Safe, adequate, and efficient service, and for the preservation of its present system as an entity, the public interest requires an immediate, reasonable, temporary increase in the existing 5-cent rate of fare, now chargeable by the Interborough Rapid Transit Company, pending the final determination of the rate, as herein prayed for.

Such a reasonable, temporary increase would enable the Interborough Rapid Transit Company to avoid a receivership; to pay its fixed charges when the same became due; to restore its cash and credit position, and thereby permit it to make arrangements for the extension or refunding of certain of its securities and obligations which fall due in the near future. Such a reasonable temporary increase would also permit additional service to the traveling public and enable the Interborough Rapid Transit Company to provide additional equipment in rolling stock for its lines as and when the same are needed.

Who Should Assume Jurisdiction?

Seattle's bus problems again came before the State Supreme Court at Olympia recently, when Chief Justice E. N. Parker issued an original writ of mandate requiring Judge Walter M. French to appear before the Supreme Court on March 31 to show cause why he, as judge of the Superior Court of Kings County, should not assume jurisdiction in the matter of the application of the Seattle & Rainier Valley Railway, Seattle, Wash., for an injunction to prevent the further operation of automobile busses by H. E. Knowles, in competition with the railway's operations inside the city limits of Seattle. Judge French recently refused to assume jurisdiction in the case brought by the railway, which charges that Knowles, operating a stage line between Seattle and Renton under a certificate of public convenience and necessity from the department of public works, is operating only a few trips each day through to Renton, but is running cars on a schedule closely paralleling the railroad's operation between the downtown terminal and the Seattle city limits. Judge French held that this was a matter for the department of public works to handle.

Says Buses Financially Irresponsible

Electric railway service is superior to bus service, in the opinion of F. H. Wilson, receiver for the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, and remains superior even though it charges a higher rate. The receiver stated that buses are free from financial obligations to the state, while railways must pay specified amounts in taxes. The maximum amount charged a bus owner by the state is \$72, according to the horsepower of the engine of his car. He need take out no indemnity bond and is not financially responsible in case of a civil action for damages, said Mr. Wilson.

On the other hand, Mr. Wilson pointed out, the bus operator uses the terminals maintained by the traction companies as a starting point for his route, and therefore wins passengers from the railway. Mr. Wilson denied that freight hauling by truck was less expensive than such service by railway. He stated that in the long run the citizens paid so much for the upkeep of the highways that it made the actual cost of shipment exceed that by electric railway.

Saginaw Forces Track Removal

By unanimous vote the City Council of Saginaw, Mich., on March 21 adopted an ouster ordinance directing the bankrupt Saginaw-Bay City Railway and its receiver to remove all trackage, overhead construction and other property from the city streets within ninety days. If the ordinance is not complied with, under its terms the city attorney is instructed to proceed in the United States District Court to secure permission for the city to do the work.

As stated in the *ELECTRIC RAILWAY JOURNAL*, issue of March 11, this action is a result of a controversy over paving work. The city claims that the railway company has not co-operated with the city in paving work, but that the work has been delayed because of the poor financial condition of the company. The Saginaw-Bay City Railway operates an interurban service between Saginaw and Flint.

Agreement Reached.—Fares will be reduced in Pine Bluff, Ark., as a result of an agreement reached between a committee of the City Council and officials of the Pine Bluff Company. Cash fares will be 6 instead of 7 cents, while books of fifty-fare tickets will be sold for \$2.50 instead of \$3. An ordinance providing for the new schedule of rates was to be presented to the City Council on March 20, and it is thought that it will be enacted and made effective without delay. The date for the beginning of the lower fares has not yet been decided upon. It is possible that wages of motormen will also be reduced, as it is estimated that the new schedule will mean a \$10,000 loss to the company.

Fare Order Expected

Chicago Surface Lines Put in Their Case—Newspapers Predict New Rate

Another order in the fare case of the Chicago (Ill.) Surface Lines is expected to be entered in the near future by the Illinois Commerce Commission. Lawyers for the city closed their evidence on March 17, and the companies will have their turn on March 28. It has been hinted by some of the newspapers that an order will be entered early in April with a view to its effect in the primary elections of April 11.

Whether this order will be another attempt to fix a 5-cent fare, or a slighter reduction from the 8-cent fare, is uncertain.

Federal Judge Carpenter on March 17 announced that Master in Chancery Morrison would take evidence in the proceedings to determine whether the present injunction against the 5-cent fare order of the commission shall be made permanent. The city insisted that the courts fix a rate of fare, but Judge Carpenter said this responsibility lies with the commission and that he would only have authority to enjoin a confiscatory rate.

During the week ended March 18, Joseph V. Sullivan, assistant to the president of the Surface Lines, was called as a witness by the city. He produced tables showing wages for trainmen and rates of fare in a large number of cities. These showed that the Chicago company has the highest wage scale of any surface railway, fixed under a contract which is being continued from month to month while negotiations are progressing with the union. It was also shown that there were practically as many increases as there were decreases in rates of fare since last November, although the city had contended that all rates were going down.

E. H. Morgan, superintendent of schedules, was another company employee introduced as a witness for the city. He was examined at length on working conditions and their bearing on time tables. He showed that the most onerous of present conditions on the surface lines had been fixed by arbitrators and said he could not tell how the terms fixed in other cities would work out in Chicago.

Among the witnesses for the city was R. A. Cahn of the United States Bureau of Labor Statistics. Mr. Cahn stated that cost of living had decreased 19.7 per cent in Chicago since June, 1920. Representatives of the trainmen's union attended all sessions and it is expected they will ask to be heard before the case closes.

598 Cities Have Increased Fares

The average rate of fare charged by electric railways, based on rates in effect in 275 cities of more than 25,000 population, was 7.37 cents on March 1, 1922. In December, 1917, the average rate of fare was 5.09 cents; in Decem-

ber, 1918, 5.72 cents; in December, 1919, 6.25 cents; in June, 1920, 7.23 cents, and in November, 1921, 7.46 cents. These figures are based on statistics compiled by the information bureau of the American Electric Railway Association. A summary of compilation of cities in which fares have been changed brought down to March 1 follows:

SUMMARY OF COMPILATION OF CITIES IN WHICH FARES WERE CHANGED

Group		Number of Cities	Total Population	Average Population
*1	Ten-cent cash fare	140	8,602,869	61,449
2	Nine-cent cash fare	6	257,500	42,917
*3	Eight-cent cash fare	83	8,032,505	96,777
4	Eight-cent fare, one-cent transfer charge.....	26	1,741,124	66,966
5	Seven-cent zones...	7	333,684	47,669
6	Six-cent city zone, 1-cent charge for rides outside.....	1	45,393	45,393
7	Six-cent city zone, Six-cent fare outside zones, 2-cent transfer charge.....	10	469,275	46,927
8	Seven-cent cash fare.....	169	8,996,529	52,233
9	Six-cent zones.....	1	41,763	41,763
10	Six-cent zones, average length, 2 miles.....	1	60,203	60,203
11	Six-cent cash fare	103	5,656,255	54,915
12	Two five-cent zones	2	195,900	97,950
13	Five-cent city zone, five cents outside.....	14	312,362	22,312
14	Five-cent fare, additional charge for transfers....	7	7,212,754	1,030,393
15	Five-cent straight fare, reduced rates eliminated	21	777,135	37,007
16	Five-cent fare reduced from higher fare.....	7	184,157	26,308
Total after deducting cities included in more than one group..		598	42,919,408	71,772

* The city of Chicago is included in both of these classes, the fare on the elevated lines being 10 cents and the surface lines 8 cents.

Transportation News Notes

Skip Stops Abandoned in Toledo.—The skip-stop plan will be abolished on the lines of the Community Traction Company, Toledo, Ohio, Commissioner Cann told the street railroad board of control at its monthly meeting on March 15. Cars will then stop at every street intersection except in a few instances where intersections are very close together. Signs will be put up to indicate just where cars stop at such points.

Issues Booklet of Schedules.—The Fort Wayne (Ind.) Service Corporation has issued a handy booklet of schedules on all its lines. It is so arranged that the reader may estimate at what time cars are due at any given point. Points of general information which will aid both passenger and company are included in the guide, the transfer system is explained, and the method of loading and unloading of passengers clarified. Fort Wayne is a city of 86,000. The weekly pass is in use in Fort Wayne.

Indianapolis Program Curtailed.—All that is left of the Indianapolis (Ind.) Street Railway re-routing and speeding

up program which the Board of Public Works undertook six weeks ago is the cross-town line in Thirty-fourth Street and Fairfield Avenue and the new route of the Riverside cars. The Board of Public Works lopped off another innovation recently when it ordered abandonment of twenty-minute cross-town service in Washington Street between Irvington and Mt. Jackson. The Indianapolis Street Railway submitted figures to show that in nine days there was an average of only thirty passengers a day on the line.

No Reduction in Fares.—At a recent hearing in Aberdeen, Wash., by the Public Service Commission, it was announced that no reduction in fares in either Aberdeen or the Grays Harbor Railway & Light Company, the local property, or Montesano would be ordered, or for intercity travel. The fare is 10 cents, or three tickets for a quarter for either city rides or intercity transportation. The hearing was called upon request of the Aberdeen City Council. E. V. Kuykendal, director of public works department, stated that there was indisputable evidence showing that there was a loss of \$36,000 in 1921, and on this showing an order for lower rates, if contested in the courts, would be set aside.

Springfield Crosstown Line Disputed.—A controversy has arisen in Springfield, Mass., over the location of the trolley approaches to the new Connecticut River bridge soon to be opened for use. The Springfield Street Railway has petitioned for a loop around Court Square Extension as the most feasible means of handling traffic without congestion of the business streets, and this proposal has the support of many business men. It is opposed by those who assert that it interferes with the plan to create a beautiful civic center. Several other plans are proposed. The company stresses the necessity of some means of connecting its East Side and West Side lines for through traffic.

Sale of Passes Increases.—The weekly pass system which has been inaugurated on the Fort Wayne city lines by the Indiana Service Corporation seems to have caught on well with the traveling public. During the first week 2,967 passes were sold and during the second week 3,546 passes were sold, making an increase of 579. The corporation has now made arrangements whereby the passes are on sale Saturdays, Sundays and Mondays by the operators of the cars. After Mondays the passes are on sale at local stores and at the light and power department of the company in the Utility Building. Some confusion has developed relative to transfers since the weekly pass was put into effect. It has, therefore, been announced by the company that transfers will not be issued to pass-holders and it is absolutely necessary that all passengers paying cash or tokens must request their transfers when they board the car. Otherwise transfers are not issued.

Personal Mention

A. E. Potter Is Club President

President of United Electric Railways
Heads New England Street
Railway Club

Albert E. Potter, president and general manager of the United Electric Railways, Providence, R. I., was elected president of the New England Street Railway Club on March 23. Mr. Potter is steeped in railway history and in railway management. He lives, eats and sleeps railway doings. And now as president of the New England club he will crowd more duties into an already active life.

And there is this to say about Mr. Potter. He will find time, in some superhuman way, even if to all unbelievers there is none. Moreover, he will do all his work with the left hand, so to speak, easily, nonchalantly, and lead you to believe that he has an hour or so to loaf with you.

It all amounts to this, that Mr. Potter

His father, who had been president of the traction lines for many years, had the same ability to work with the public. The names of Albert T. Potter and Albert E. Potter stand for right leadership to the people in territories which the lines serve.

Albert E. Potter has proved this fair-minded attitude over and over again in his association with the railway. He started his work in the track department of the Union Railroad, turned switches, directed cars in the congested areas, was everywhere at once to make the transportation system work efficiently. Then he was made superin-

tendent of conductors and motormen in 1895, and established his record for squareness. In 1900 he became superintendent of transportation, the first one to hold the office just created. As some one expressed it not long ago, all the superintendent of transportation has to do is everything the general manager doesn't do, and in addition, hire and discharge all employees, supervise operation of the roads, handle emergencies and keep the cars to schedule time. In 1906 he took R. I. Todd's place as general manager, and had his own chance to look at the superintendent's job from a different angle. After that, it was but a step to the president's chair, increased responsibilities, greater service, and more and more honors. And thus he became president of the New England Street Railway Club.

E. J. Burdick Is Vice-President

General Manager of Detroit United
Railway Elected to Board
of Directors

Announcement of the appointment on March 11 of Ellsworth J. Burdick as vice-president and general manager of the Detroit (Mich.) United Railway will be received with great pleasure by his hosts of friends in the railway and engineering world. The advancement of Mr. Burdick again exemplifies the old saying that there is always room at the top for the hard and intelligent worker and doer.

Mr. Burdick received his early electrical training with the Brush Electric Manufacturing Company, Cleveland, Ohio, which he joined in 1889. Later he went to the Westinghouse company. In 1895 he went to Detroit to erect the electric machinery for the Everett-Moore syndicate, which was then entering the Detroit transportation field through what is commonly referred to in Detroit as the Pingree 3-cent lines.

Shortly after this came the consolidation of the railway systems in Detroit and Mr. Burdick was retained as one of the force in charge of the electrical and power distribution systems. In this work he came under the direct notice of such men as J. C. Hutchins, Albert H. Stanley and F. W. Brooks. These men were so impressed with Mr. Burdick's natural ability that he was used in special investigation work, particularly in the taking over of the many interurban lines that became a part of the extensive Detroit United System of nearly 1,000 miles of track.

In 1901 Mr. Burdick became superintendent of power and in the years that followed he continued the investigation of many of the problems arising in the company, so that his knowledge of his own particular field became supplemented by a fund of information of all the departments. In 1916 he was made assistant general manager, and gradually relieved Mr. Brooks, then president, of many arduous details, par-

ticularly during the later years when Mr. Brooks' health began to fail.

At the annual meeting of the stockholders of the company in February of this year, when a considerable revision was made in the directorate of the company, Mr. Burdick was the unanimous choice for general manager of the prop-



A. E. POTTER



E. J. BURDICK

is alive every minute. Whereas others may mentally die, and need to slough off their old skins, Mr. Potter is perpetually animated. He can, therefore, do twice as much in half the time.

For thirty-odd years Mr. Potter has been connected with the railways of Rhode Island. For the most part he has been officiating as general manager or president. In 1914 he was elected president of the Rhode Island Company, after serving as general manager of the company from 1906. In 1921, when the Rhode Island Company was reorganized, after more than a year of receivership, into the United Electric Railways, Mr. Potter was made president and general manager.

Mr. Potter showed his capabilities during the period that the Rhode Island Company was in the Slough of Despond. For then the public was criticizing the company and the Mellon control. But Mr. Potter's attitude was universally admired, and throughout the trouble he kept the public with him.

This appointment has since been followed by his election to the board of directors and to the vice-presidency. He remains general manager as well. The recent honors conferred on Mr. Burdick are not only gratifying to his many railway and engineering friends throughout the country but are particularly pleasing to his fellow workers in the Detroit United Railway.

Mr. Burdick has taken active part in the work of the American and the Central Electric Railway Associations. He is past-president of the Detroit Engineering Society, a member of the American Society of Mechanical Engineers and is a registered mechanical and electrical engineer in Michigan.

While Mr. Burdick is a tremendously vigorous worker, he is also a firm believer in recreation, which he finds at his summer home on Briggs' Lake, a two hours drive out of Detroit. There behind his house is his garden, while in the waters in front the finny tribe abounds.

B. R. T. Makes Appointments

John Weigel, Charles Johnson, Harry Dittmar Are Made Division Superintendents

The appointment of three division superintendents of the Brooklyn Rapid Transit Company, New York, N. Y., has been announced. John Weigel, assistant superintendent at DeKalb Avenue Depot, has been appointed division superintendent of Crosstown Division to take the place of J. J. Riley, who resigned on Nov. 30, 1921. Charles Johnson, assistant superintendent at Franklin Avenue Depot, has been raised to the rank of division superintendent of Franklin Avenue Division. Harry E. Dittmar, supervisor of the Power Saving Department, has been made division superintendent of DeKalb Avenue Division.

John Weigel, the new superintendent

assistant superintendent in charge at DeKalb Avenue Depot.

Charles Johnson, who was appointed division superintendent of Franklin Avenue Division on Jan. 15, has been in the employ of the company for nearly twenty-nine years and more than twenty-seven years of this time he has spent in one depot, Bergen Street, in various capacities. He entered service at Bergen Street Depot as a conductor in March, 1893. He was successively motorman, register taker, inspector and chief inspector of the Central Division. He also held the posts of night depot master and day depot master and just before his new position, he had that of assistant superintendent of Franklin Avenue Depot.

Harry E. Dittmar, division superintendent of DeKalb Avenue Division, has been with the company for more than sixteen years. His first position was

sociation of Claim Agents. The association has as members claim agents of steam railroads, electric railways and power companies.

L. T. Peck, for many years president of the Honolulu Rapid Transit & Land Company, Honolulu, H. I., has retired from that position. A. L. Castle, formerly secretary of the company, has been elected president to succeed Mr. Peck. Mr. Peck continues with the company as chairman of the board.

E. G. Connette, president of the United Gas & Electric Corporation, was recently elected a director of the White Oil Corporation. W. B. Emmert, vice-president of the United Gas & Electric Engineering Corporation, of which Mr. Connette is also president, was elected a director of the White Oil Company at the same time. George Bullock, who is connected with the



H. E. DITTMAR



JOHN WEIGEL



CHARLES JOHNSON

at Crosstown, is a man of wide and varied experience in street railroading. He started upon his career as a railroader in 1896, when he went to work as a motorman at Fifty-eighth Street Depot. By the end of 1897 he became an inspector and in the following year he was made general inspector for the whole Surface Transportation Department.

In 1899, Mr. Weigel was appointed assistant superintendent of Canarsie Depot and a year later he was made chief of the time-table department, a position he held for more than fifteen years. In 1916 he resigned to enter the employ of the United Gas & Electric Engineering Corporation, Manhattan. For this corporation he spent one year in traveling to inspect the various properties in which the corporation was interested. One of its properties was the International Railway, which operates in Buffalo, Niagara Falls and Lockport, and in 1917 Mr. Weigel was made general superintendent of this company with headquarters in Buffalo.

Mr. Weigel, after severing his connection with the United Corporation and its properties in 1920, spent six months doing special work for various railway companies, among them the Lancaster Railway, the Elmira Railway and the Boston Elevated Railroad.

From September, 1920, to his present appointment, Mr. Weigel has been

that of motorman at Maspeth Depot, in 1905. Four years later he became a register inspector and in 1912 a special inspector and was assigned to the Time-table Department.

Mr. Dittmar was made supervisor of headways in 1920, and later that year he was made assistant superintendent in charge at Maspeth Depot. On Jan. 1, 1921, he was appointed supervisor of the power saving department, in which capacity he was serving when his recent appointment as division superintendent at DeKalb Avenue Division took effect.

Col. H. H. Dean has been appointed district counsel of the Georgia Railway & Power Company, Atlanta, Ga. He has been with the company for several years, and will now have charge of cases in the northeastern Judicial Circuit.

Marion B. Bracken, assistant to the chief of the claim department of the United Railways, St. Louis, Mo., has been with this department of the company for twenty-five years. Members of the company gave a banquet in his honor recently to celebrate his excellent service.

L. F. Wynne, general claim agent of the Georgia Railway & Power Company, Atlanta, Ga., was recently elected vice-president of the Southeastern As-

United Gas & Electric Company, was made a director also.

J. C. Walter is now master mechanic of the Danville Street Railway & Light Company, Danville, Ill. He has been with the Illinois Traction System, Peoria, which owns the Danville company, for eleven years, beginning as freight car repairman. He became successively chief freight car inspector and general foreman of the passenger car department.

Obituary

Edward H. Ives, assistant general superintendent of the Detroit (Mich.) United Railway, died on March 19 as a result of injuries received when an interurban train of the Detroit United Company struck the automobile which he was driving.

E. H. Sellers, for many years chairman of the tramways committee of Huddersfield, England, died recently. His position on the board of aldermen as chairman of the tramways committee placed him practically as the operating head of the Huddersfield Corporation Tramways. During the war his duties were extremely arduous.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

Census Bureau's First Report on Lumber Prices

The first report on mill prices of lumber was issued the middle of February by the Bureau of Census of the Department of Commerce. It gives an average of the prices of actual sales of lumber at the mills. The reports were obtained by the Bureau of the Census directly from the mills. Each item price published is a simple average of the prices reported on that item.

The 1919 average, the 1920 average

began early in May and was completed in August, these being the first meters to be placed in use having the car-inspection dials of the present design. An article on this installation appeared in the ELECTRIC RAILWAY JOURNAL for Feb. 19, 1921.

From the experience on this one division over a period of eighteen months' operation, the company was convinced by October, 1921, of the value of the meters and was ready to extend their use over the entire system. But

AVERAGE MILL PRICES PER THOUSAND FEET

	Southern Pine		Douglas Fir	
	No. 1 Common 2 in. x 4 in. x 16 ft. SISIE	B and Better Flat Grain Flooring 1 in. x 4 in.	No. 1 Common 2 in. x 4 in. x 12 ft.—14 ft. SISIE	No. 2 V. G. Flooring 1 in. x 4 in.
1919 average.....	\$38.51	\$49.82	\$22.48	\$48.27
1920 average.....	48.41	73.56	26.73	62.64
1921 October.....	25.55	43.93	11.72	49.84
November.....	29.50	47.80	13.36	50.58
December.....	29.91	49.01		

	Northern Pine		Red Cypress	Hemlock
	No. 1 Common 2 in. x 4 in. x 12 ft.—16 ft. SISIE	No. 1 Common Flat Grain Flooring	No. 1 Common Flat Grain Flooring	No. 2 Common
1919 average.....	\$43.33	\$59.75	\$49.50	\$32.24
1920 average.....	44.33	73.33	65.83	42.94
1921 October.....	24.00	65.00	43.50	20.34
November.....	28.83	65.63	43.38	22.65
December.....				

and October, November and December, 1921, figures are given for ten representative items of Southern pine, Northern pine and red cypress, respectively; for nine items of Douglas fir and three of hemlock.

Hardwood prices as given are from Northern mills only, the majority of which are located in Wisconsin and Michigan.

P. R. T. Buys 2,181 More Meters

The Philadelphia (Pa.) Rapid Transit Company has contracted with the Economy Electric Devices Company for what is probably the largest single order for power-saving devices ever placed. This comprises 2,181 Sangamo Economy watt-hour meters having the power-saving and car-inspection dials. It will provide a complete equipment for all the surface cars and principal utility cars owned by the company.

The study of power-saving devices by this company began as far back as the fall of 1917. This led up to a forty-five-car competitive test in the spring of 1919. The savings which were effected on this occasion evidently satisfied the company as to the merit of the watt-hour meter, for an order for 310 meters was placed in February, 1920. These meters made a complete equipment for the cars of the Callowhill division. The installation of the meters

to make sure that there were no new developments which could better the showing made by the meters, another competitive test was conducted on two representative routes with different groups of cars on each route. The devices were masked and normal figures of power consumption were first obtained. Then the power-saving test was started early in December and lasted until Christmas. The test satisfied the company as to the efficiency of the Economy meter in inducing savings under the severe operating conditions imposed by Christmas traffic and winter weather, as the order for the complete equipment of the entire system followed.

Proposed Merger of Machine Tool Manufacturers

A rumor has been rife for several weeks of the merger of several leading machine tool manufacturing companies. It is now possible to announce that the plans for the merger have finally been completed, and while the name of the new corporation has not definitely been decided upon an official announcement will probably be made shortly. The new company will be not only one of the largest machine tool organizations, but one of the largest mergers of machinery manufacturing concerns that has ever been formed.

The companies included in the merger

are the Lodge & Shipley Machine Tool Company, the Carlton Machine Tool Company, Newton Machine Tool Works, Inc., Betts Machine Company, the Colburn Machine Tool Company, Hilles & Jones Company, Modern Tool Company, and Dale Machinery Company.

Bulletin on Coal Supply Issued

The Coal Bureau of the Natural Resources Department of the Chamber of Commerce of the United States recently issued a bulletin giving an analysis of the coal situation, the purpose of which is to give business men information regarding possible fuel supplies in the event of a strike of miners on April 1. The bulletin concludes with a summary of statements from 648 typical retail dealers showing the days' supply of coal usually carried by them on April 1 and also in the hands of various classes of consumers.

Pacific Electric Purchases New Equipment

President Paul Shoup of the Pacific Electric Railway, Los Angeles, Cal., has advised the California Railroad Commission that he had ordered fifty new cars required by the commission at the time of the readjusted fares. The cars ordered are of all-steel construction and will have center entrances. Each will have a seating capacity of sixty-five passengers.

The cars will be used exclusively on the Hollywood line in accordance with the commission's order. They will supplant cars of the old type. The equipment has been ordered from the St. Louis Car Company and the Westinghouse Manufacturing Company and will cost \$800,000. The contracts call for delivery within four months and the cars will be put in service as soon as they are received and equipped for operation.

With the cost of new equipment just purchased, cost of the new subway construction and acquisition of additional rights-of-way for this improvement, the Pacific Electric Railway will during the year 1922 have made a capital expenditure of approximately \$3,000,000 in additions and betterments to its service.

Metal, Coal and Material Prices

Metals—New York		March 21, 1922
Copper, electrolytic, cents per lb.....	12.875	
Copper wire base, cents per lb.....	14.125	
Lead, cents per lb.....	4.725	
Zinc, cents per lb.....	5.037	
Tin Straits, cents per lb.....	29.00	

Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.....	\$4.575	
Somerset mine run, Boston, net tons.....	1.875	
Pittsburgh, mine run, Pittsburgh, net tons	2.00	
Franklin, Ill., screenings, Chicago, net tons	1.925	
Central, Ill., screenings, Chicago, net tons	1.75	
Kansas screenings, Kansas City, net tons	2.50	

Materials		
Rubber-covered wire, N. Y. cents per lb...	5.90	
Weatherproof wire base, N. Y., cents per lb.	13.50	
Cement, Chicago net prices, without bags...	1.94	
Lined oil, (5-bbl. lots), N. Y., cents per gal.	89.00	
White lead, (100-lb. keg), N. Y., cents per lb.	12.25	
Turpentine (bbl. lots), N. Y., cents per gal.	85.00	

Rolling Stock

Savannah (Ga.) Electric & Power Company has ordered thirty one-man cars, planning to reduce its operating expenses.

Southern Pacific Company, Portland, Ore., has just received twelve new electric cars which cost approximately \$400,000. These are being assembled at the Beaverton shops and will be used for service on the Southern Pacific electric lines in Oregon.

Interstate Public Service Company, Indianapolis, Ind., has ordered from the Cincinnati Car Company the five lightweight, one-man, interurban cars referred to in the ELECTRIC RAILWAY JOURNAL for March 11. These will be used to give suburban service between New Albany and Jeffersonville, Ind., and Louisville, Ky.

Track and Roadway

Brockton & Plymouth Street Railway, Plymouth, Mass., within the next few weeks expects to rebuild two miles of track.

Arkansas Valley Railway, Light & Power Company, Pueblo, Col., will rebuild three to five miles of track using new ties and rails.

Meridian Light & Railway Company, Meridian, Miss., is extending its East End Thirteenth Street line from Sixteenth Avenue north to connect with the Ninth Avenue line.

Savannah (Ga.) Electric & Power Company is planning to spend \$375,000 in improvements during 1922. Last year the company spent about \$120,000 in extensions and improvements.

Eastern Wisconsin Electric Company, Sheboygan, Wis., has been granted permission by the city to extend its track on the south side of the city. About a mile of line will be installed.

Calgary, Alta.—The street railway department in charge of the local municipal railway has applied to the City Commissioners for authority to call for tenders for thirty-five tons of steel rails to be used on Centre Street.

Tri-City Railway, Davenport, Iowa, will soon start in on its Fifteenth Street paving project and will put in new rails. The improvement will cost more than \$100,000. At the same time the city will start work on its part of the paving program.

Chicago & Joliet Electric Railway, Joliet, Ill., expects to rebuild 5,700 ft. of double track, paved with brick, on its interurban line through the city of Lockport within the next ninety days. No material has as yet been purchased for this job.

Pacific Electric Railway, Los Angeles, Cal., expects soon to authorize the double tracking of its line on Broadway between Olive and Bonito Avenues. The tracks will cross those of the Salt Lake

Railroad. The company will begin soon to negotiate for a franchise covering this improvement.

Cape Fear Railways, Inc., Fayetteville, N. C., expects to start work on the extension to Camp Bragg soon, in order that construction may be completed by June 1. Cross ties and rails have already been purchased and construction has been started at the Camp Bragg end.

Trenton & Mercer County Traction Corporation, Trenton, N. J., proposes to lay a spur track from its power house on Lincoln Avenue and place cables underground. This will affect thirteen land owners who own the strip, 40 ft. x 20 ft., which is desired by the company. Justice Trenchard in the New Jersey Supreme Court has appointed three commissioners to appraise this strip of land, located on Seward Avenue.

Arkansas Valley Interurban Railway, Wichita, Kan., is making track connections at Hutchinson with the steam roads, at an expenditure of about \$25,000 and involving about $\frac{3}{4}$ mile of track. Track connections are also being made at Sedgwick at an expense of several thousand dollars. A new steel concrete bridge is to be built soon, at a cost of about \$5,000, which will make practically every bridge on the line steel concrete.

Power Houses, Shops and Buildings

Ohio Electric Railway, Lima, Ohio, will have to construct substations at Yoder, New Hampshire and Huntsville owing to a change in the cycle of current.

Philadelphia, Pa.—The Director of City Transit has announced that sealed proposals for "cable connections for Power Feed and Negative Return, Contract 644" and for constructing an "Addition to the Car Inspection Shop in the Bridge Street Yard, Contract 648" for the Frankford Elevated Railway will be received at the Director's office until Thursday, March 30.

Arkansas Valley Interurban Railway, Wichita, Kan., is constructing a new brick concrete station at Halstead, which with some track connections will cost about \$8,000. Contract has been let for this improvement. The company is also proposing to build an addition to its shops during this summer, also putting in some six miles of additional feeder wire from one of its substations.

Los Angeles (Cal.) Railway has placed orders for new electrical equipment to be used in two new substations involving an expenditure of approximately \$250,000. The substations will be located in the southwest section and northwest area respectively. The new stations will operate automatically like the Vernon and Garvanza stations, which have been referred to previously. The machinery will be furnished by the General Electric Company.

Trade Notes

McClellan & Junkersfeld, Inc., New York, N. Y., have been engaged as engineers and constructors for the new power plant which the Union Electric Light & Power Company is building on the Illinois side of the Mississippi River, south of the city limits of East St. Louis.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has appointed C. E. Skinner, manager research department, as assistant director engineering in that company. His duties as assistant director will cover research, standards and other work along these lines. He will be located in the main engineering offices at East Pittsburgh.

E. C. Stockdale, general sales manager of Page & Hill Co., with offices in Chicago, recently resigned. It is understood that the sales of the company will be directed from the home office in Minneapolis in the future. W. D. Schneider has been appointed manager of the Chicago office of the company with sales jurisdiction over Illinois, Indiana and Ohio, and the southern half of Wisconsin.

Diamond Power Specialty Corp., Detroit, Mich., has taken over the business and plant of the Diamond Power Specialty Company, which formerly conducted the Diamond Soot Blower business. Norman L. Snow, formerly of the Terry Steam Turbine Company, has been elected president and treasurer of the new company. Mr. Snow is a graduate of Yale Scientific School and Massachusetts Institute of Technology, and has been in the power plant field for the past eighteen years.

Daniel E. Costigan, late captain and inspector of police in New York, who recently retired from the Police Department, has established a private detective agency in the Mills Building, 15 Broad Street, New York. Captain Costigan has been recognized as a man of exceptional ability by such police commissioners as the late Theodore Roosevelt, General Bingham and General E. V. Greene, and his cognomen in New York has been "Honest Dan." He is prepared to undertake public utility business.

New Advertising Literature

The Martindale Electric Company, Cleveland, Ohio, has issued a new four page circular on Commutator Grinding and Slotting, which fully describes its Imperial Commutator Stones and other devices for undercutting mica.

Century Wood Preserving Company, Pittsburgh, Pa., has just issued a bulletin on storing and seasoning railway ties. This gives information on air and steam seasoning and the factors influencing the type of seasoning used. Information is also given in connection with the handling of ties in storage.

PEACOCK BRAKES

Needed for New Cars

It's not so much the car itself as the equipment on it, that makes or mars the maintenance records. Because the modern car must be lighter, more efficient and more economical to maintain, it follows that every piece of equipment must be specified with technical discrimination.

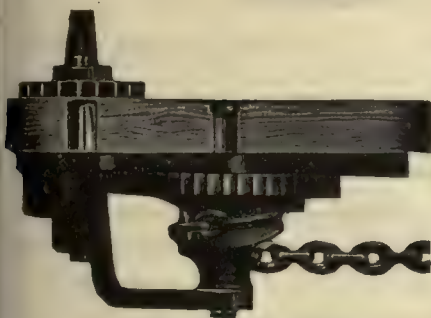
We are in a position to know what hand brake is best suited for any particular type of car. For over eighteen years we have been making just one thing—a leading class of hand brake equipment for steam and electric railways.

Every Peacock Brake has those three essential qualities of a suitable brake fully developed—*most rapid action, great power and ample capacity*. The Peacock Staffless, our especial development for the safety car, has three times the power of the ordinary hand brake, occupies less platform space, and is an absolute assurance of real safety for emergency use.

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MANY cracker box philosophers have wrangled this deep question with no solution.

HERE'S ANOTHER ONE—

Which comes first,—the lubricating oil or the machine that uses it?

The answer is: It depends.

In the old hit or miss days of lubrication, a machine was erected, and then there was a scurrying around to find an oil that would work on it.

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But because of the evolution of Lubrication Engineering (and with due modesty we say this) largely through the example set by the alert body of men who comprise the staff of Texaco Lubrication Engineers, the old way is passing.

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We give them scientific advice. We tell them the right grade of Texaco Lubricating Oil to use—even before the unit is built.

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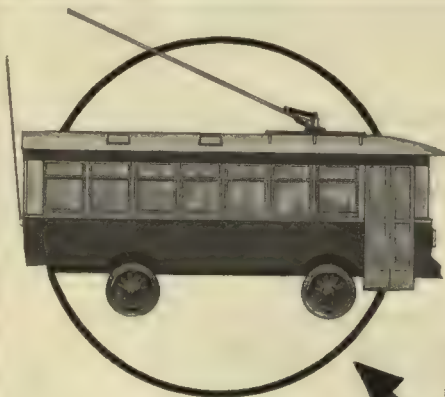
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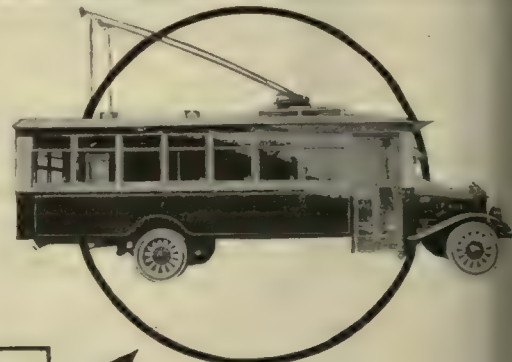
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Gehennah



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That's what happens when *fish* and *flesh* have gone *a-foul*.

They don't stipulate what the punishment is, but it is probably something like this:

Man is placed at machine operating sweetly with Morganite brushes

—man higher up says "we've got to buy cheaper brushes"—and does

—then operator is told that he must operate machines just as sweetly with cheap brushes

—well, of course, it can't be done, so that's the heluvit.

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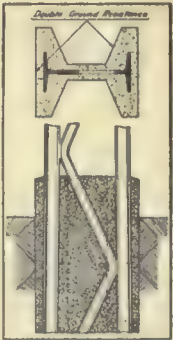
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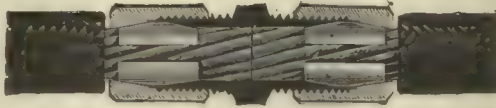
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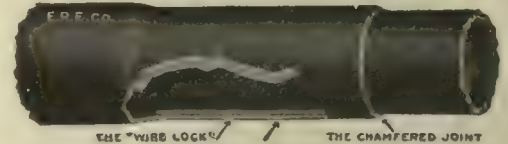
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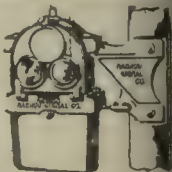
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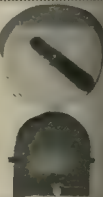
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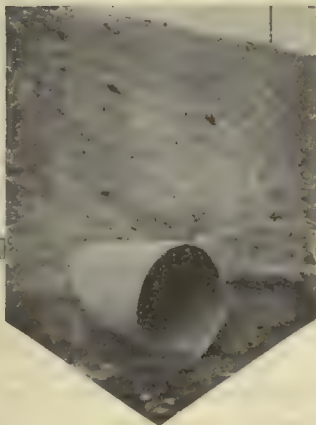
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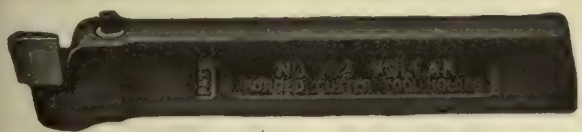
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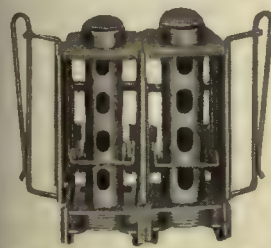
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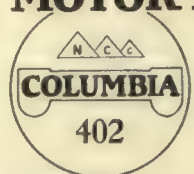
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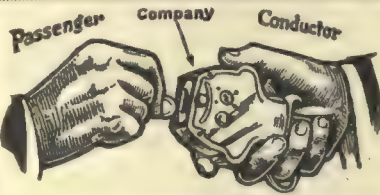
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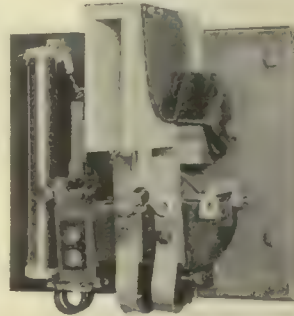
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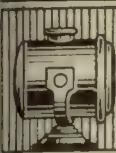
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Railway Track-work Co.

Bollers
Babcock & Wilcox Co.

Boiler Tubes
Cambria Steel Co.
Midvale Steel & Ordnance Co.

Bond Testers
American Steel & Wire Co.
Rail Welding & Bonding Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Sup. Co.
Ohio Brass Co.
Rail Welding & Bonding Co.

Bonds, Rail
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Rail Welding & Bonding Co.
Westinghouse E. & M. Co.

Brackets and Cross Arms
(See also Poles, Ties, Posts, etc.)

American Bridge Co.
Bates Exp. Steel & Tr. Co.
Electric Ry. Equip. Co.
Electric Service Sup. Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Br. Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Johns-Manville Inc.
National Brake Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Bridges and Buildings
American Bridge Co.

Brooms, Track, Steel or Rattan
Amer. Rattan & Reed Mfg. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co., Inc.
National Carbon Co.
U. S. Graphite Co.
Westinghouse E. & M. Co.

Brushes, Graphite
National Carbon Co.

Brushes Wire Pneumatic
Ingersoll-Rand Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

Bunkers, Coal
American Bridge Co.

Buses, Motor
Brill Co., The J. G.
Republic Truck Sales Corp.

Bushings
Nat'l Fibre & Insulation Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.

Cables (See Wires and Cables)
Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies

Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Cars, Dump
Differential Steel Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cambria Steel Co.
Kuhlman Car Co., G. C.
Midvale Steel & Ordnance Co.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.
Transit Equipment Co.

Cars, Self-Propelled
General Electric Co.

Castings, Brass, Composition or Copper
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Br. & Metal Co.

Castings, Gray Iron and Steel
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
St. Louis Car Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.

Castings, Steel
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Castings, Trolley
Electric Service Sup. Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Circuit Breakers
Automatic Reclosing Circuit Breaker Co.
Cutter Co.
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Dossert & Co.
Electric Ry. Equip. Co.
Electric Service Sup. Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)
Coal Bending and Winding Machines
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.

Colls, Armature and Field
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Colls, Choke and Kicking
General Electric Co.
Westinghouse E. & M. Co.

Coin-Counting Machines
Electric Service Sup. Co.
Internat'l Register Co., The
Johnson Fare Box Co.

Commutator Slotters
Electric Service Sup. Co.
General Electric Co.
Westinghouse E. & M. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec. Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Tr. Br. Co.

Concrete Reinforcing Bars
Cambria Steel Co.
Midvale Steel & Ordnance Co.

Cundamers
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Connectors, Solderless
Dossert & Co.
Frankel Connector Co.
Westinghouse E. & M. Co.

Connectors, Trailer Car
Consolidated Car Heating Co.
Electric Service Sup. Co.

Controllers or Parts
Allis-Chalmers Mfg. Co.
Automatic Reclosing Circuit Breaker Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Electric Service Sup. Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Conveying and Hoisting Machinery
American Bridge Co.
Columbia M. W. & M. I. Co.

Copper Wire
Anaconda Copper Min. Co.

Cord Adjusters
Nat'l Fibre & Insulation Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Sup. Co.
Internat'l Register Co., The
Roebling's Sons Co., J. A.
Samson Cordage Works
Silver Lake Co.

Cord Connectors and Couplers
Electric Service Sup. Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Amer. Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cranes
Allis-Chalmers Mfg. Co.
Cross Arms (See Brackets)
Crossing Foundations
International Steel Tile Co.
Crossing Signals (See Signals, Crossing)

Crossings, Frog and Switch
Wharton, Jr. & Co., Wm.

Crossings, Track (See Track, Special Work)
Crushers Rock
Allis-Chalmers Mfg. Co.
Culverts
Canton Culvert & Silo Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Electric Service Sup. Co.
Morton Mfg. Co.
St. Louis Car Co.

Cutouts
Johns-Manville Inc.
Dealers' Machinery
Archer & Baldwin
Electric Equipment Co.
Derailing Devices (See also Track Work)
Wharton, Jr. & Co., Wm.

Destination Signs
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.

Detective Services
Wish Service, P. Edward

Dogs, Lath
Williams & Co., J. H.

Door Operating Devices
Con. Car Heating Co.
Nat'l Pneumatic Co. Inc.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.

Draft Rigging (See Couplers)
Drills, Rock
Ingersoll-Rand Co.

Drills, Track
American Steel & Wire Co.
Electric Service Sup. Co.
Ingersoll-Rand Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Sup. Co.

Electrical Wires and Cables
Amer. Electrical Works
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. H.
Archbold-Brady Co.
Arnold Co., The
Beeler, John
Bylleby & Co., H. M.
Day & Zimmermann
Engel & Hevenor, Inc.
Feustel, Robert M.
Ford, Bacon & Davis
Gould, L. E.
Hemphill & Wells
Holst, Englehardt W.
Jackson, Walter
Kelley, Cooke & Co.
Parsons, Klapp, Brinkerhoff & Douglas
Richey, Albert S.
Sanderson & Porter
Sangster & Matthews
Smith & Co., C. E.
Spooner & Merrill
Stone & Webster
White Engineering Corp., The J. G.
Witt, Peter

Engines, Gas, Oil or Steam
Allis-Chalmers Mfg. Co.
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Fare Boxes
Cleveland Fare Box Co.
Economy Elec. Devices Co.
Johnson Fare Box Co.
National Ry. Appliance Co.

Fences
Cambria Steel Co.
Midvale Steel & Ordnance Co.
Fences, Woven Wire and Fence Posts
American Steel & Wire Co.
Fenders and Wheel Guards
Brill Co., The J. G.
Cleveland Fare Box Co.
Electric Service Sup. Co.
Fibre and Fibre Tubing
Continental Fibre Co.
Johns-Manville Inc.
Nat'l Fibre & Insulation Co.
Westinghouse E. & M. Co.

Field Colls (See Colls)
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Johns-Manville Inc.
Floodlights
Electric Service Sup. Co.
Flooring Composition
Amer. Mason Safety Tread Co.
Johns-Manville Inc.
Western Electric Co.
Floor Plates
Abrasive Metals Co.
Cambria Steel Co.
Columbia M. W. & M. I. Co.
Midvale Steel & Ordnance Co.
Standard Steel Works Co.
Williams & Co., J. H.

Fuses and Fuse Boxes
Columbia M. W. & M. I. Co.
Consolidated Car Heating Co.
General Electric Co.
Johns-Manville Inc.
Westinghouse E. & M. Co.
Williams & Co., J. H.

Fuses, Refillable
Columbia M. W. & M. I. Co.
General Electric Co.
Gages, Oil and Water
Ohio Brass Co.

Gaskets
Johns-Manville Inc.
Power Specialty Co.
Westinghouse Tr. Br. Co.

Gasoline Torches
Economy Elec. Devices Co.

Gas-Electric Cars
General Electric Co.

Gas Producers
Westinghouse E. & M. Co.

Gates, Car
Brill Co., The J. G.

Gear Blanks
Cambria Steel Co.
Midvale Steel & Ordnance Co.
Standard Steel Works Co.

Gear Cases
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
General Electric Co.
National Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Gongs (See Bells and Gongs)
Morganite Brush Co., Inc.
Greases (See Lubricants)

Grinders and Grinding Supplies
Railway Track-work Co.

Grinding Blocks and Wheel
Railway Track-work Co.

Guards Cattle
American Bridge Co.

Guards, Trolley
Electric Service Sup. Co.
Ohio Brass Co.

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Gladium Co.

Hammers Pneumatic
Ingersoll-Rand Co.

Harns, Trolley
Anderson Mfg. Co., A. & J. M.
Electric Service Sup. Co.
More-Jones Br. & Metal Co.
Nuttall Co., R. D.
Star Brass Works

Headlights
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Economy Elec. Devices Co.
Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car (Stove)
Electric Service Sup. Co.
Smith Heater Co., Peter

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Ohio Brass Co.

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Allis-Chalmers Mfg. Co.

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Electric Service Supplies Co.
General Electric Co.
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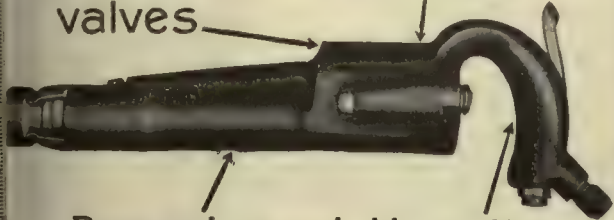
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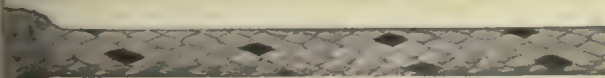
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Case Hardened Bushings
Case Hardened Nuts and Bolts

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Bronze Axle Bearings

Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardener pins in stock. Samples furnished. Write for full data.

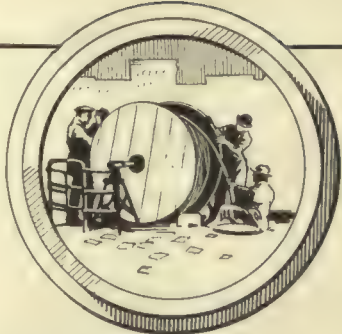
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Can you afford to wait till 1923?

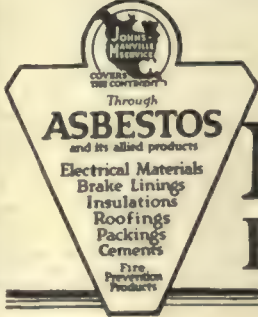
Nineteen twenty-two will be a big year for underground construction because:

1. The Bond Market is eagerly absorbing Public Utility securities as rapidly as they are offered. Money is no longer difficult to secure for capital expenditures by Central Stations.
2. Many cities are conducting campaigns of public improvement in order to assist in reducing the number of unemployed workers. This municipal work means, in part, new pavements. It is always wise, as a matter of good financial judgment and public policy, to lay extra duct lines before new pavements are placed, so that it will not be necessary to disturb the new street surface for several years.
3. Labor of the type used in underground construction is available at satisfactory rates.
4. Materials used in duct lines are at very low prices. Fibre conduit is back to its 1914 price. Portland cement is approximately at its 1916 price.

This summary of fundamental conditions represents our judgment of the outlook in the underground construction field in 1922. We further believe we should honestly counsel buyers of Fibre Conduit to get their inquiries into the hands of responsible producers as early as possible.

The present low prices of Fibre Conduit and the unusual spring demand now expected make early action a wise course for buyers who will require prompt service.

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Sterling Varnish Co.
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Electric Service Sup. Co.
General Electric Co.
Johns-Manville Inc.
Sterling Varnish Co.
Westinghouse E. & M. Co.
Insulators
(See also Line Material)
Anderson Mfg. Co., A. & J. M.
Electric Ry. Equip. Co.
Electric Service Sup. Co.
Flood City Mfg. Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Insulator Pins
Electric Service Sup. Co.
Hubbard & Co.
Insurance, Fire
Marsh & McLennan
Jacks (See also Cranes, Hoists and Lifts)
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Elec. Service Supplies Co.
Joints, Rail
Rail Joint Co.
Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.
Junction Boxes
Standard Underground Cable Co.
Lamp Guards and Fixtures
Anderson Mfg. Co., A. & J. M.
Electric Service Sup. Co.
General Electric Co.
Westinghouse E. & M. Co.
Lamps, Arc and Incandescent
(See also Headlights)
Anderson Mfg. Co., A. & J. M.
General Electric Co.
Westinghouse E. & M. Co.
Lamps, Signal and Marker
Nichols-Lintern Co.
Ohio Brass Co.
Lanterns, Classification
Nichols-Lintern Co.
Lath Attachments
Williams & Co., J. H.
Lighting Protection
Anderson Mfg. Co., A. & J. M.
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Line Material (See also Brackets, Insulators, Wires, etc.)
Anderson Mfg. Co., A. & J. M.
Archbold-Brady Co.
Columbia M. W. & M. I. Co.
Dossert & Co.
Electric Ry. Equip. Co.
Electric Service Sup. Co.
General Electric Co.
Hubbard & Co.
Johns-Manville Inc.
More-Jones Br. & Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Locking Spring Boxes
Wharton, Jr., & Co., Wm.
Locomotives, Electric
General Electric Co.
Westinghouse E. & M. Co.
Lubricating Engineers
Galena-Signal Oil Co.
Texas Company, The
Lubricants, Oil and Grease
Galena-Signal Oil Co.
Texas Company, The
Machine Tools
Columbia M. W. & M. I. Co.
Machine Work
Columbia M. W. & M. I. Co.
Manganese Steel Castings
Wharton, Jr., & Co., Wm.
Manganese Steel Special
Truck Work
Wharton, Jr., & Co., Wm.
Meters (See Instruments)
Economy Elec. Devices Co.
Money Changers
Galef, J. L.
Motor Buses
(See Buses, Motor)
Motor Leads
Dossert & Co.
Motorists' Seats
Brill Co., The J. G.
Electric Service Sup. Co.
Wood Co., Chas. N.
Motors, Electric
Allis-Chalmers Mfg. Co.
Westinghouse E. & M. Co.
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General Electric Co.
- Nails**
Cambria Steel Co.
Midvale Steel & Ordnance Co.
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Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Oil (See Lubricants)
Omnibuses
(See Buses, Motor)
Packing
Elec. Service Supplies Co.
Johns-Manville Inc.
Westinghouse E. & M. Co.
Paints and Varnishes, Insulating
Sterling Varnish Co.
Paints and Varnishes for Woodwork
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Pavement Breakers
Ingersoll-Rand Co.
Paving Bricks, Filler and Stretcher
Nelsonville Brick Co.
Paving Material
Amer. Br. Shoe & Fdry. Co.
Nelsonville Brick Co.
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Electric Service Sup. Co.
Ohio Brass Co.
Pinion Pulleys
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
General Electric Co.
Wood Co., Chas. N.
Pinions (See Gears)
Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Electric Service Sup. Co.
Ohio Brass Co.
Westinghouse Tr. Br. Co.
Pipe Fittings
Power Specialty Co.
Standard Steel Works Co.
Westinghouse Tr. Br. Co.
Planers (See Machine Tools)
Pliers, Insulated
Electric Service Sup. Co.
Pneumatic Tools
Ingersoll-Rand Co.
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Hubbard & Co.
Poles, Metal Street
Bates Exp. Steel Truss Co.
Electric Ry. Equip. Co.
Hubbard & Co.
Poles, Trolley
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
Nuttall Co., R. D.
Poles, Tubular Steel
Electric Ry. Equip. Co.
Elec. Service Supplies Co.
Poles and Ties Treated
Duncan Lumber Co.
Power Saving Devices
Economy Elec. Devices Co.
National Ry. Appliance Co.
Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Pumps
Allis-Chalmers Mfg. Co.
Ingersoll-Rand Co.
Schutte & Koerting Co.
Pumps, Vacuum
Ingersoll-Rand Co.
Punches, Ticket
Bonney-Vehslage Tool Co.
Internat'l Reg. Co., The
Wood Co., Chas. N.
Rail Grinders (See Grinders)
Rails, Steel
Cambria Steel Co.
Midvale Steel & Ordnance Co.
Railway Material
Johns-Manville Inc.
Railway Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.
Rail Welding
Rail Welding & Bonding Co.
Ry Track-work Co.
Rattan
Amer. Rat. & Reed Mfg. Co.
Brill Co., The J. G.
Electric Service Sup. Co.
St. Louis Car Co.
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Brill Co., The J. G.
McGulre-Cummings Mfg. Co.
Electric Service Sup. Co.
Internat'l Reg. Co., The
Rooke Automatic Reg. Co.
Reinforcement, Concrete
American Steel & Wire Co.
Repair Shop Appliances (See also Coil Banding and Winding Machines)
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
- Repair Work** (See also Coils)
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.
Replacers, Car
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
Resistance, Grid
Columbia M. W. & M. I. Co.
Resistance, Wire and Tube
General Electric Co.
Westinghouse E. & M. Co.
Resistances
Consolidated Car Heating Co.
Retrievers, Trolley (See Catchers and Retrievers, Trolley)
Rheostats
General Electric Co.
Westinghouse E. & M. Co.
Roofing Asbestos
Johns-Manville, Inc.
Sanders, Track
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.
Sash Fixtures, Car
Brill Co., The J. G.
Scrapers Track (See Cleaners and Scrapers, Track)
Seating Materials
Brill Co., The J. G.
Seats, Car (See also Rattan)
Amer. Rattan & Reed Mfg. Co.
Brill Co., The J. G.
St. Louis Car Co.
Second-Hand Equipment
Archer & Baldwin
Electric Equipment Co.
Shades, Vestibule
Brill Co., The J. G.
Hale & Kilburn Corp.
Pantastote Co.
Shavels
Allis-Chalmers Mfg. Co.
Brill Co., The J. G.
Hubbard & Co.
Slide Bearings (See Bearings, Center and Side)
Signals, Car Starting
Con. Car Heating Co.
Electric Service Sup. Co.
Nat'l Pneumatic Co., Inc.
Signals, Indicating
Nichols-Lintern Co.
Signal Systems, Block
Electric Service Sup. Co.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Wood Co., Chas. N.
Signal Systems, Highway
Crossing
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Slack Adjusters
(See Brake Adjusters)
Sleet Wheels and Cutters
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Ry. Equip. Co.
Elec. Service Supplies Co.
More-Jones Br. & Metal Co.
Nuttall Co., R. D.
Smokestacks, Car
Nichols-Lintern Co.
Snow-Plows, Sweepers and Brushes
Amer. Rat. & Reed Mfg. Co.
Brill Co., The J. G.
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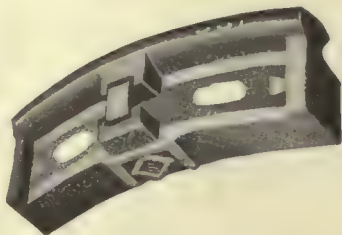
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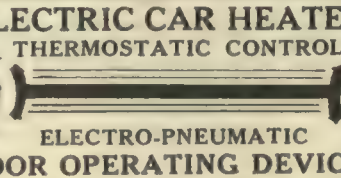
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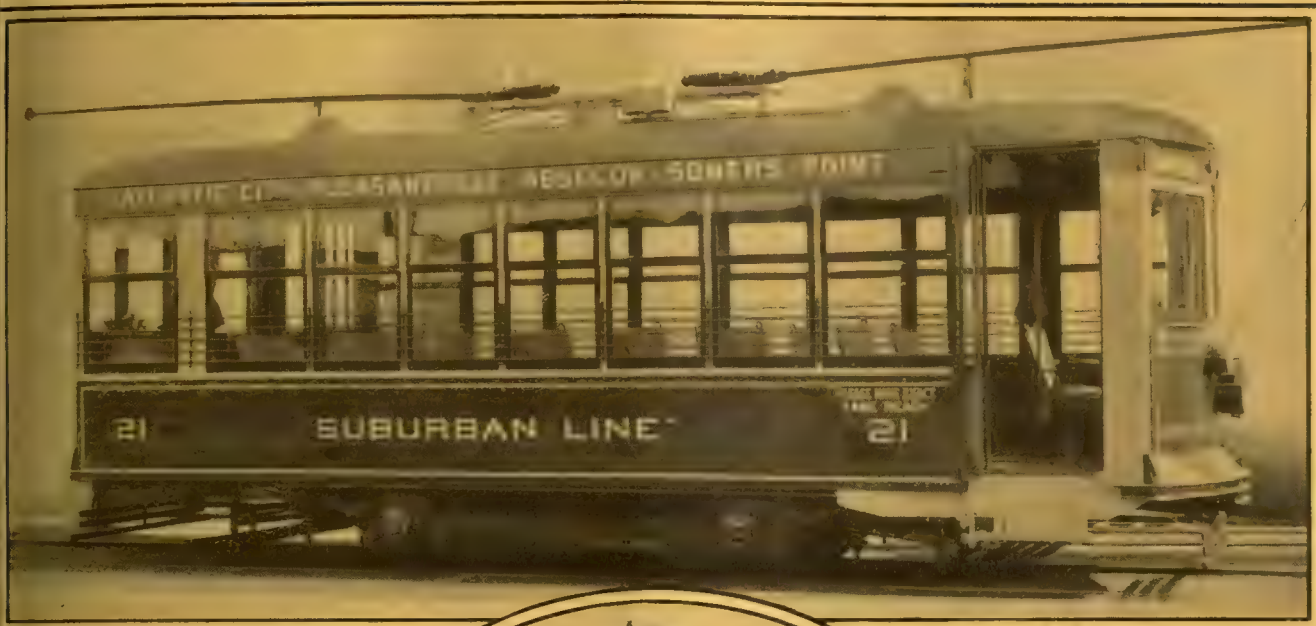
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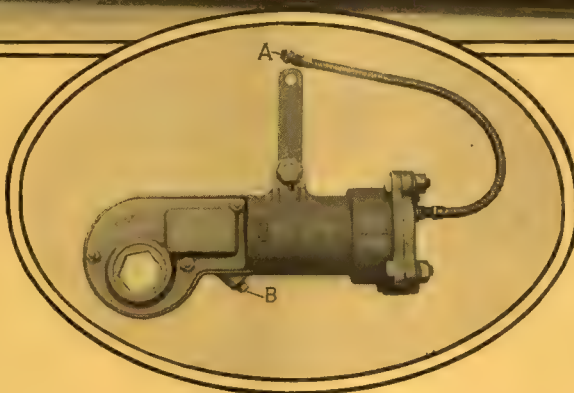
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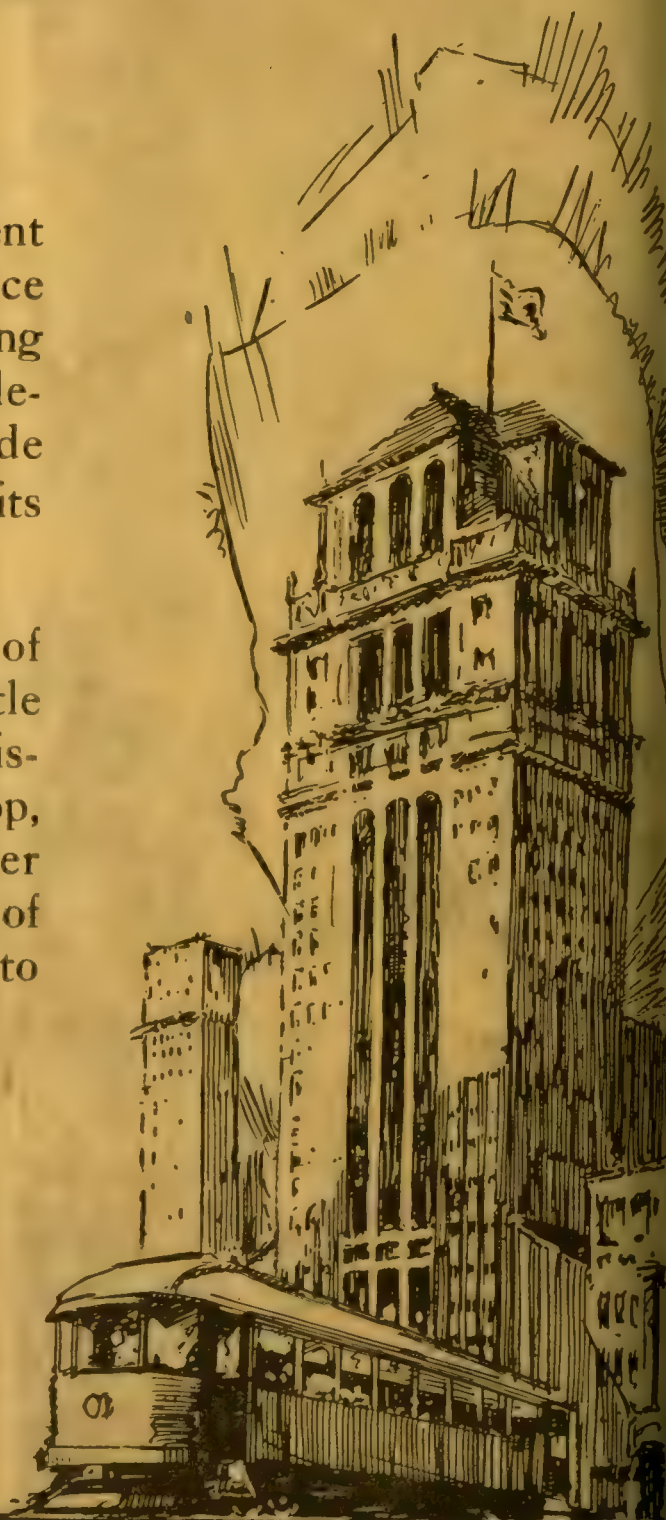
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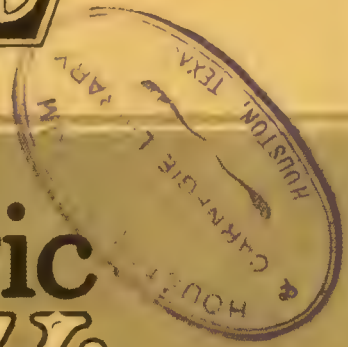
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Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors

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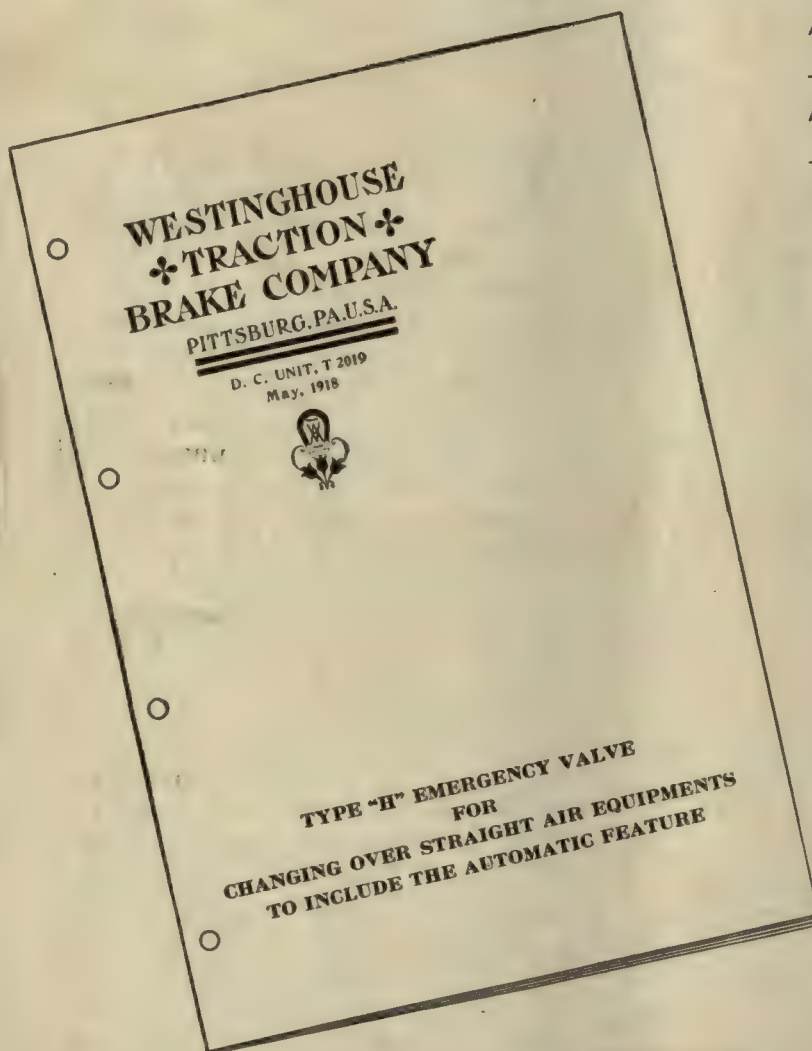


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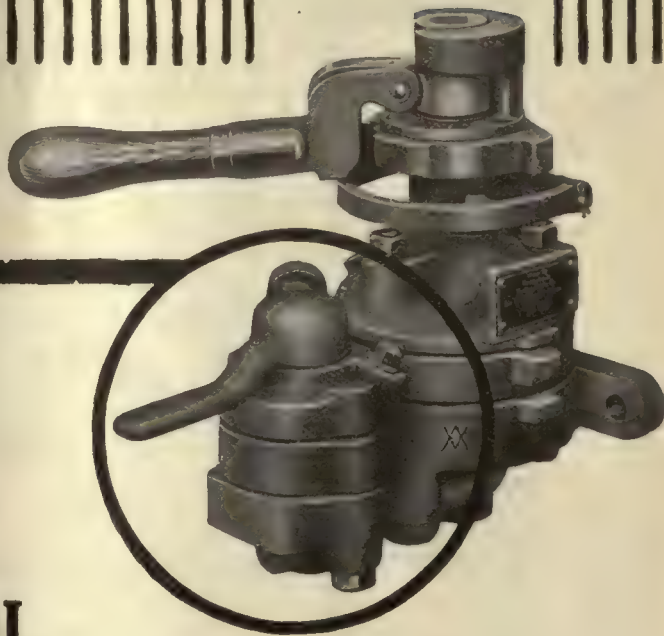
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PROCEED



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CAUTION



PROCEED



FOR DOUBLE TRACK *Interurban Railways*

Union automatic
 ■ block signals ■

afford a simple system of indications easily understood by trainmen.

The continuous A. C. track circuit makes possible the use of "polarized" or "wireless" control and insures the display of the proper indication at all times.

LIGHT

PROCEED



STOP



CAUTION



PROCEED



On the New York State Railways



On the Oakland, Antioch and Eastern

UNION EQUIPMENT WILL SOLVE YOUR INTERURBAN TRAFFIC PROBLEMS

Let us study your operating conditions and cooperate with you in considering what *automatic block signaling* will do for *your line*.



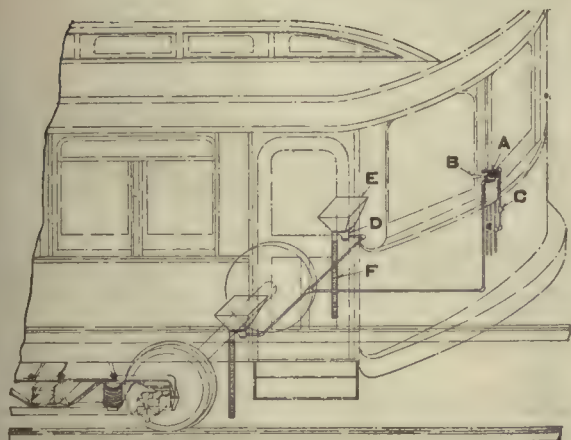
Union Switch & Signal Co.

SWISSVALE, PA.



O-B Air Sander Equipment

Positive—and economical of air



Typical installation of O-B Air Sander Equipment. "B" is engineer's valve handle. "E" is a hopper which may be built in any convenient point near the wheel.

"A"—O-B Air Sander Valve
Diaphragm Type—Patented



Located directly over engineer's valve. Opened by pressing the handle—closes automatically. Airtight flexible diaphragm, which separates the plunger and stem, absolutely prevents leaking of air around the stem.

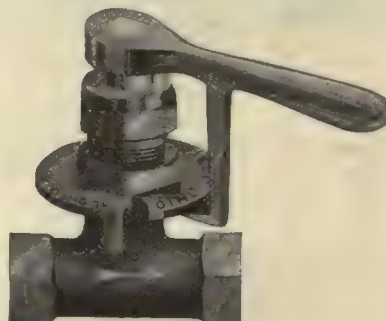
Form 1, illustrated, is tapped for 1/2-inch pipe and is supported by the pipe. Form 2 is tapped for 1/4-inch pipe and has lugs which are screwed to car body.

"D"—O-B Air Sand Trap



A compact trap which fits in any corner where it has to go. Won't let sand through except under air pressure. Full, curved passages let sand flow freely under pressure. 2-inch, sherardized, clean-out plug in bottom. Threaded for 1/4-inch air line. Spout of Form 1, illustrated, is equipped with studs to hold 2-inch sander hose. Form 2 spout is threaded for 1-inch pipe coupling.

"A"—O-B Independent Air Sander Valve



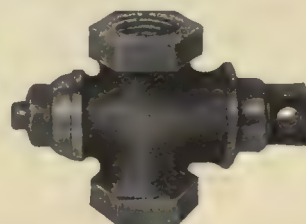
Opened or closed by turning handle. Tapered seat gives close regulation of air flow and positive shutoff. Handle is removable for double-end operation, but can be taken off only when valve is closed.

"F"—O-B Wire Sander Hose



Deposits sand directly on the rail always—even on curves.

"C"—O-B Air Reducing Valve



Limits, to any desired pressure, the amount of air which flows when the sander valve is wide open.



The **Ohio** **Brass** Co.
Mansfield, Ohio, U.S.A.

New York Philadelphia Pittsburgh Charleston, W. Va. Chicago Los Angeles San Francisco Paris, France
Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators

Insurance plus Marsh & McLennan Service

Standards

The measurement of relative fire hazards is based on certain requirements, which, when conformed to, carry minimum rates. This rate for a standard power house is .07 and electrical equipment .12 per hundred dollars of value.

A recent inspection of a large power house, which the owners believed to be a standard building in every respect, and on which they carried no insurance, resulted in a rate of .37 on building and .43 per hundred dollars on electrical machinery with the customary 80% coinsurance clause added for this, so called, standard structure *because—*

Roof beams and columns were not insulated, transformers were not standard, no waste cans and no chemical extinguishers were provided, there were frame clothes lockers, lubricating oils were not properly cared for and workmen's automobiles were permitted in the building.

These hazards, easily and inexpensively removed represent the difference between .07 and .12 cents and .37 and .43 cents per hundred dollars in insurance costs.

Marsh and McLennan can help you lessen your hazards and decrease your insurance costs. May we tell you more of Marsh and McLennan Service?

MARSH & MCLENNAN

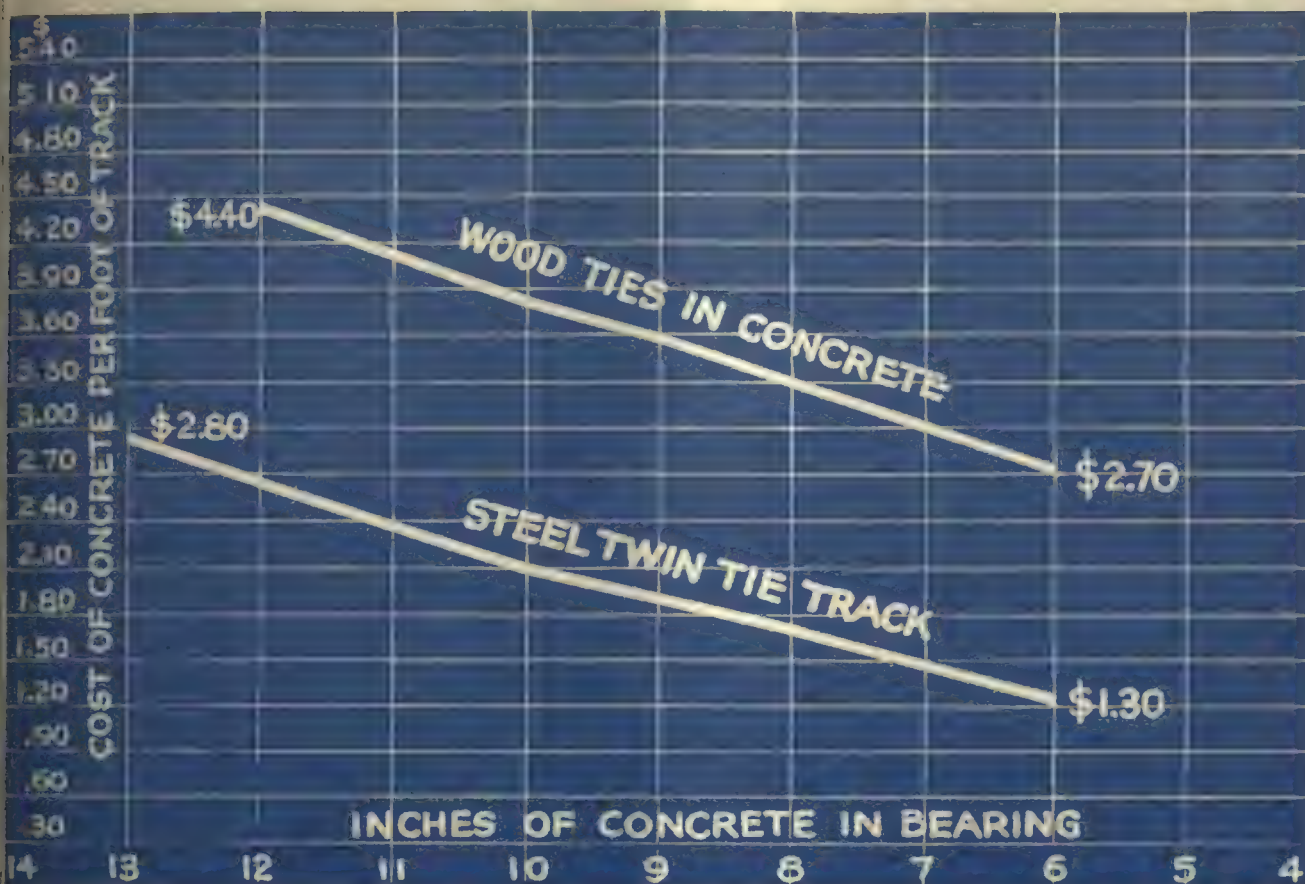
175 W. Jackson Blvd. Chicago, Ill.

Minneapolis
New York
Detroit

Denver
Duluth
Columbus

San Francisco
Seattle
Cleveland

Winnipeg
Montreal
London



Non-essential Concrete Costs More Than Steel Ties

IN conventional types of concrete track construction with wood ties, often *only 50 per cent* of the total cubic contents of the track foundation transmits the wheel loads from the tie to the subgrade.

The inefficient concrete between wood ties and at their ends is an economic loss when regarded as part of the track foundation.

The fundamental economy of Steel Twin Tie

construction depends upon a more complete utilization of the concrete in the track foundation than is possible with wood tie designs.

The comparative initial economy of Steel Twin Tie construction depends on the type of construction with which it is compared.

In order to determine the possible saving on your property, include a comparative estimate with Steel Twin Ties on the work your track department has up for 1922.

*1922 Price on Twin Ties at your delivery point
will go forward by mail or wire at your request.*

THE INTERNATIONAL STEEL TIE COMPANY, Cleveland, Ohio

International Steel Twin Ties manufactured and sold in Canada, by Sarnia Bridge Co., Ltd., Sarnia, Ont.

Steel Twin Tie Track

Elreco Tubular Poles

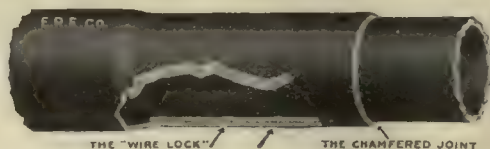
Lowest Cost—Lightest Weight
Least Maintenance
Greatest Adaptability

The committee on power distribution of the A. E. R. A. recommended tubular steel poles. The ELRECO tubular steel pole stands pre-eminent.

ELRECO poles may be set without regard to the direction or strain of the load to be carried—applying any load to an ELRECO at right angles to its length produces the same strain regardless of the direction in which the load is applied—they possess great reserve strength. You can save the additional pole necessary on curves or corners by using ELRECO steel poles.

They have no angles or pockets to retain moisture—they have no corners accessible to corrosion—they are most accessible to painting and they lend themselves most readily to combination railway and lighting purposes.

Patented Wire Lock Swedge Joint



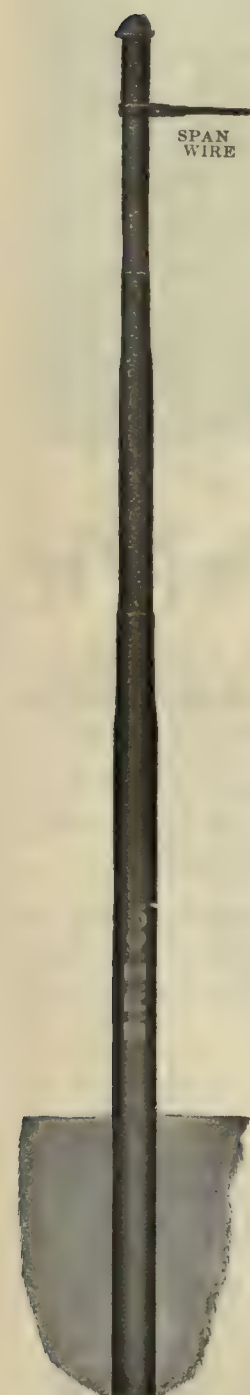
ELRECO poles are assembled with our well known Patented Wire Lock Swedge Joint.

The edge of the outer tube is chamfered, so that water can not rust and corrode the pole at this joint.

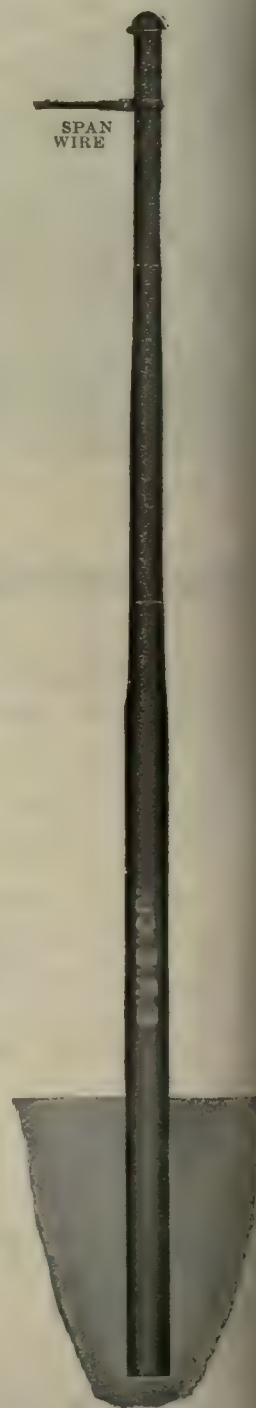
It is impossible for poles made up in this manner to telescope at the joints, either by overloading or by the drop test.

The Electric Railway Equipment Co.
Cincinnati, Ohio

New York Office: 30 Church St.



Plain Tubular Steel Pole



Plain Tubular Steel Pole

ADVERTISE

your service to these places

BASE BALL

SOUTH ST.
BANCROFT BELT
POINT PLACE
TOLEDO BEACH
SPECIAL
EX



KEYSTONE-HUNTER Illuminated Car Signs

Spring is here.

The baseball season is beginning. Parks and playgrounds are opening. The circus is on the move. The beaches will soon be wide open. All of which means extra revenue.

Have you ever thought of advertising your service to these places?

In addition to designating the destination points of each car *Keystone-Hunter Illuminated Signs* advertise by day and night to the people in the streets the fact that your road operates regular service to recreation seekers.

Send for the data sheets

ELECTRIC SERVICE SUPPLIES Co.

Manufacturers of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Street

NEW YORK
50 Church Street

CHICAGO
Monadnock Bldg.

Branch Offices: Boston, Scranton, Pittsburgh. Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver.



QUALITY TIES

**INTERNATIONAL
TREATMENT**

Ship Today Service

Treated ties in storage in one small portion of our yard at Texarkana, Texas, on February 1, 1922.

Having Seasoned Ties in stock ready for right-of-way distribution, we can serve the Railroad Field advantageously and economically.



"Creosoting is conceded to be the most effective of all treating processes" (Camp)

*International Treated Ties Reduce Maintenance Expense—
Insure Operating Efficiency*

CREOSOTED
TIES PILING POLES TIMBERS

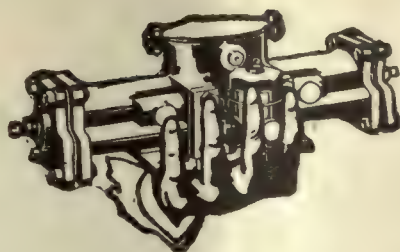
International Creosoting & Construction Co.

General Office—Galveston, Texas

Texarkana, Texas.

Plants
Beaumont, Texas.

Galveston, Texas.

*Modernize!**Pneumatize!*

Stead-ay! Both Doors!

Cheerily the conductor of a pneumatized car will be heard urging his patrons to use all doors available.

Because it's just as easy for him to open and close two or three sets as it is to control one.

National Pneumatic Motorman's Signal Lights takes care of *this*. And the conductor has something else to be cheery about through having no signals to give and fret over.

National Pneumatic Motorman's Signal Lights and Safety Interlocking Door Control take care of *that*.

Let's help you to pick what you need from

The Complete National Pneumatic "Rushour" Line

Door and Step Operating Mechanisms
Safety Interlocking Door Control

Door and Step Control
Motorman's Signal Lights

Multiple Unit Door Control

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

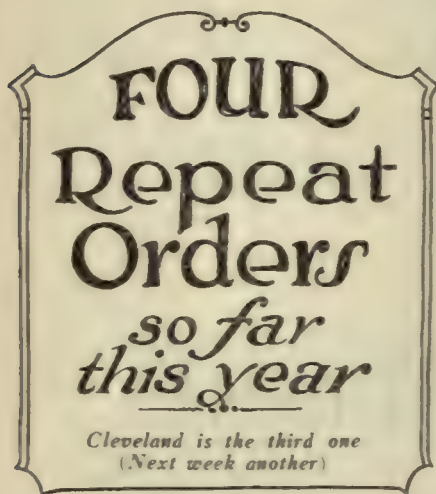
National Pneumatic Company, Inc.

50 Church St., New York

Edison Bldg., Chicago

Works, Rahway, N. J.

Cleveland comes again:—



This Repeat Order *6 More* **DIFFERENTIAL CARS**

Makes Total of 15 for Cleveland

In 1915—3 Differential Cars

In 1920—6 Differential Cars

In 1922—6 Differential Cars

With those first three cars, Mr. C. H. Clark, Engineer of Maintenance of Way, Cleveland Railway Co., achieved a saving of \$160,000 per mile on a 20 mile track reconstruction job. You can read his article on it in the Electric Railway Journal of March 17, 1917.

That explains their repeat orders for Differential Cars—Let us demonstrate them to you. Actual performance counts. Differentials *do* save big money under all sorts of conditions.

THE DIFFERENTIAL STEEL CAR CO.
Findlay, Ohio





Electric Signals

Operating cars on single track, without an efficient signal system, will cost you, sooner or later, a good round sum in damages when the inevitable accident occurs. Perhaps you have had one already. Look out for the next!

A very small amount invested now to purchase and install United States Electric Signals will be not

only the means of preventing such a disastrous occurrence, but it will enable you also to speed up your line, to operate more cars on quicker schedules without double-tracking and without additional turn-outs.

Get our estimate on a complete installation. You need signals!

and

Automatic Track Switches Type 16

Quick acting electric track switches have become a real necessity in the operation of snappy, up-to-date service, especially where safety cars are used.

Our new Type 16 switch, recently placed on the market after exhaustive tests of many months' service on several Massachusetts roads, is of simplest construction, yet so rugged and so well-protected that maintenance troubles and expense are practically eliminated. The trolley contactor mounts on standard ears—a factor which will appeal to experienced line-men.

Electric switches—good ones—save time of cars on the road. *Speed up.*

SEND FOR FULL DESCRIPTION AND PRICES

For Faster and Safer Service

United States Electric Signal Company
West Newton, Massachusetts

Representatives:

Western: Frank F. Bodler, Monadnock Bldg., San Francisco
Foreign: Forest City Electric Services Supply Co., Salford, England





Syracuse Car Turnstile in operation on single-end, double-truck, one-man car.

A Rear-Entrance Front-Exit One-Man Car

Now possible with the

SYRACUSE CAR TURNSTILE

Patents Pending

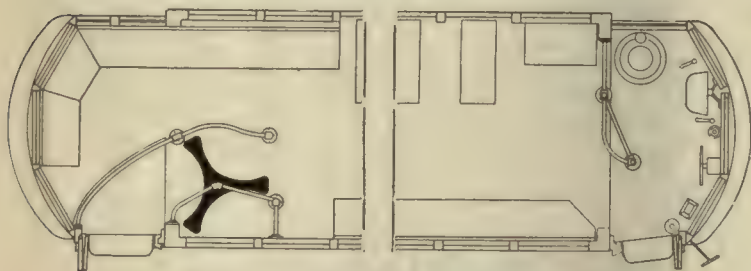
Eliminates Congestion

Double-Truck cars have proved their efficiency for city transportation. Don't take a backward step when you change to one-man operation.

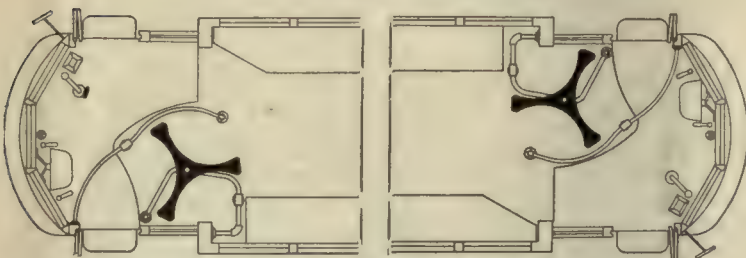
Do you think your service is too heavy for one-man operation? We doubt it. If your service is handled with double-truck, two-man cars at present, you can handle it with one man by equipping with the Syracuse Car Turnstile system—the quick, safe, easy access way.

Keep the entrance and exit at different ends of the car to allow rapid passenger interchange. The location of entrance and exit at different ends of the car has already proved itself in two-man city service as the most practical way. The turnstile congestionless car adapts itself to any type of safety device that is required. In case of emergency the motorman can release the turnstile so as to permit exit of passengers via the rear end.

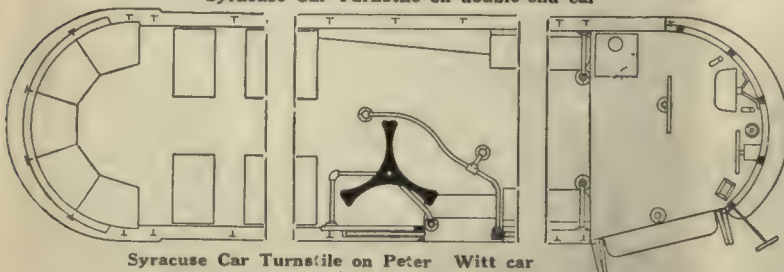
Let our engineers show you.



Syracuse Car Turnstile on single-end car



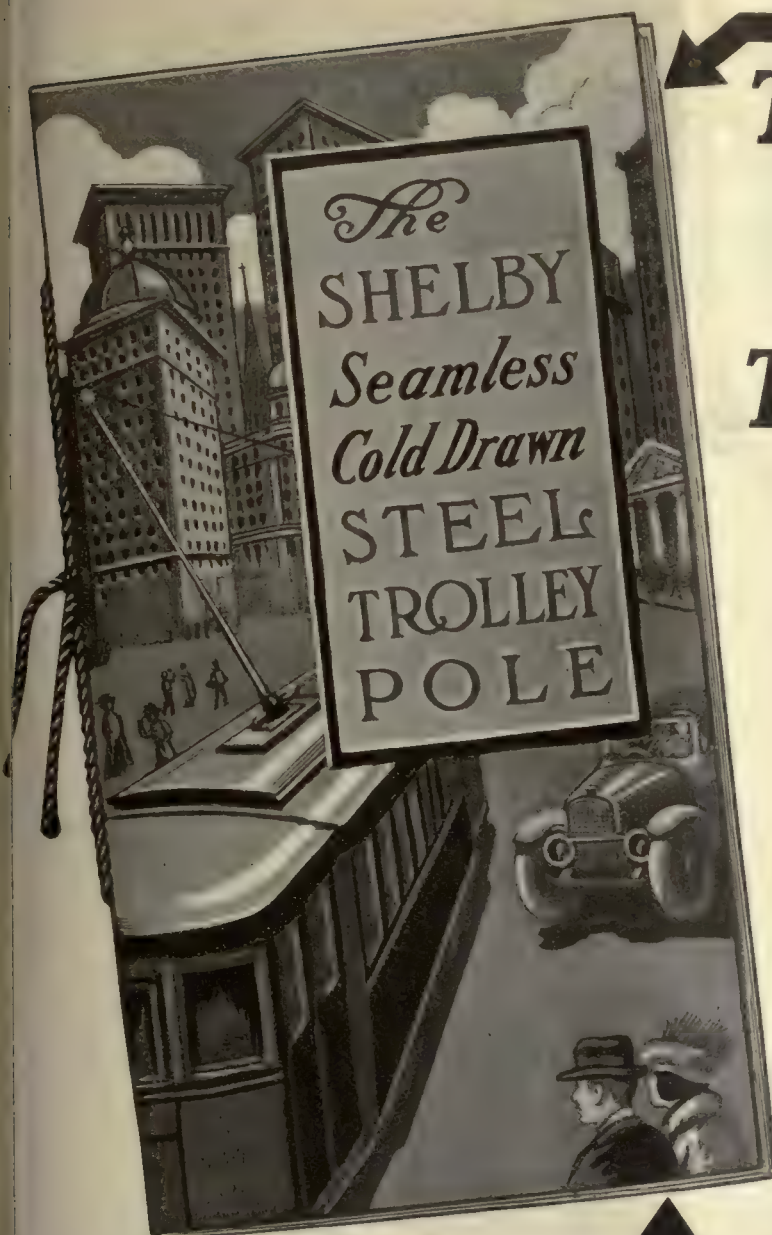
Syracuse Car Turnstile on double-end car



Syracuse Car Turnstile on Peter Witt car

THE CAR TURNSTILE CORPORATION

383 West Fayette St.,
Syracuse, New York



The First Step to **BETTER TROLLEY POLE SERVICE**

**Send for
Your Copy
TODAY**

If you are interested in trolley poles of maximum strength with minimum weight and neat design, this booklet will be well worth your while.

The two different designs of "SHELBY" SEAMLESS COLD DRAWN STEEL TROLLEY POLES (Standard "A" and Standard "B") are described and the methods of testing at the mill are outlined.

Complete tables of dimensions, loads, etc., are also given. A copy may be obtained from any District Sales Office of National Tube Company without charge.

Reinforced only where the reinforcement is needed. Resiliency and lightness without sacrifice of essential strength characterize "SHELBY" SEAMLESS COLD DRAWN STEEL TROLLEY POLES.

NATIONAL TUBE COMPANY, PITTSBURGH, PA.

General Sales Offices: Frick Building

DISTRICT SALES OFFICES

Atlanta Boston Chicago Denver Detroit New Orleans New York Salt Lake City Philadelphia Pittsburgh St. Louis St. Paul
PACIFIC COAST REPRESENTATIVES: U. S. Steel Products Co. San Francisco Los Angeles Portland Seattle
EXPORT REPRESENTATIVES: U. S. Steel Products Co. New York City

Tulc—and expert service— insure correct lubrication

"Overall Specialists"

The service men who work with you on your lubricating problems are not "experts on theories." They put on overalls and get right down to brass tacks—pack your cars—*show* you how and why Tulc should be used. They get results—real money-saving results—99 times out of a hundred. The hundredth time there is no charge for the service.

CONSIDERED as a lubricant alone, Tulc has many advantages that are distinctive. Tulc lubricates perfectly with no loss. It will not harden, leaves no residue, and will not grow rancid nor corrode metals.

But to secure proper lubrication, something more than mere lubricant is necessary. A lubricant exactly adapted to the individual requirements of the individual property, and applied in proper quantity is the full solution of the problem, and nothing less will do.

Tulc is sold on the basis of a definite prescription to fit a particular set of operating conditions. Wherever Tulc is in service, it is there as the result of a careful study of the lubrication requirements.

The result of this policy is a marked reduction of lubricating costs, savings of 40% or more over former methods.

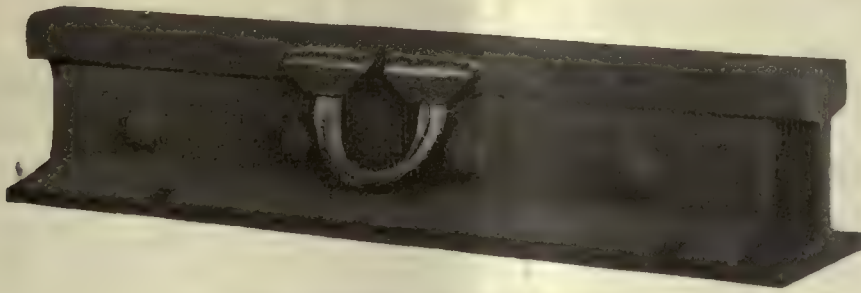
If you are interested in better lubricating methods at a materially reduced cost, it will pay you to learn more about Tulc and the Universal Lubricating Service. Write today, and our complete service will be placed at your disposal.

The Universal Lubricating Co.

Offices: Schofield Bldg.
Works: Sweeney Ave.
Cleveland, Ohio



—scientifically and
accurately compounded to
reduce lubricating costs



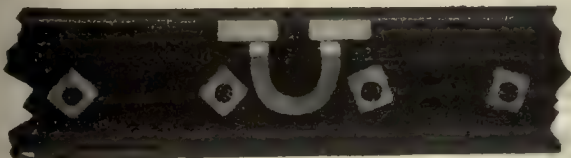
Type "AT-F" Arc Weld Bond

We have faith in Erico Rail Bonds

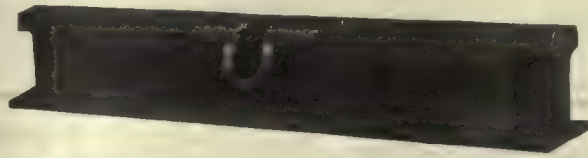
Because their design and manufacture is based on our seventeen years' experience as rail bonding specialists.

The Erico Brazed Bond is pre-eminent in the rail bonding field. For extended application it has no superior in ease, rapidity or economy of application. The conductivity of the Brazed Bond is unrivalled.

Erico Arc Weld Bonds are characterized by the electrically brazed union of the iron terminal and copper conductor. This true molecular union insures maximum conductivity. The iron terminals are readily welded to the rail with the metallic arc.



Type "ET" Brazed Bond



Type "AU" Arc Weld Bond

Investment in ERICO Rail Bonds for your Spring bonding will establish both your faith and satisfaction in their performance.

*Brazed and Arc Weld Bonds in every type and capacity
Write for our low prices—samples gratis*

The Electric Railway Improvement Co.
Cleveland, Ohio

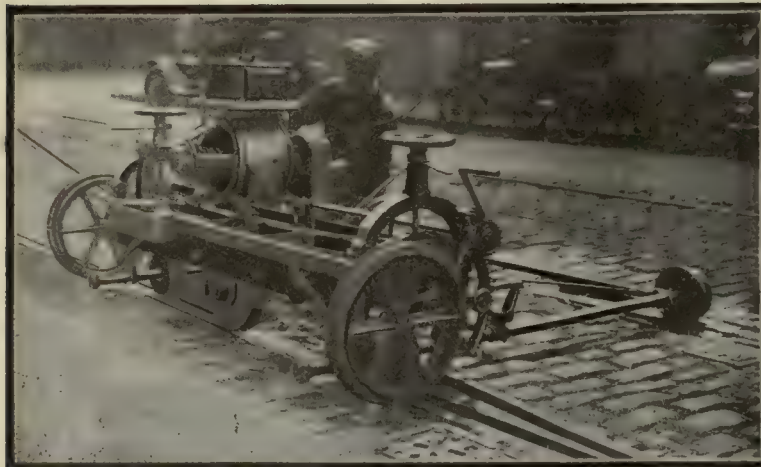


AJAX Electric Arc Welder

A 155 lb. high capacity resistance welder, especially designed and built for efficient maintenance of railway track.

Get Busy Now!

*Don't delay that track rehabilitation
any longer!*



ATLAS Rail Grinder

An efficient rotary grinder, high speed, light weight, suitable for working under heavy traffic conditions.



RECIPROCATING Track Grinder

Unsurpassed for removing all trace of corrugations from straight and curved track.

RAILWAY TRACK WORK CO., 3132-38 E. Thompson St., PHILADELPHIA,

Chas. N. Wood Co., Boston.

Electrical Engineering & Mfg. Co., Pittsburgh.

AGENTS:

Atlas Railway Supply Co., Chicago.

P. W. Wood, New York.



Riding on Oil

How many realize that in all railroad travel, either steam or electric, we are literally riding on a film of oil—a thin spread film composed of tiny globules that act as roller bearings between the sliding surfaces of metal.

The life or durability of oil film is proportionate to the vitality of the tiny globules that build it—their *quality*. And this is dependent upon their origin—the basic crudes which forms them.

Galena Oils possess not only the natural body and stamina peculiar to highest quality in basic constituents, but are still further reinforced and strengthened by Galena process in compounding. This extra strength means longer life—greater mileage. It enables them to resist the strains of weight and speed without breaking down. Their superior “body” protects and preserves the bearings. In other words, they give a lubricating service that has never been equalled by other oils.

*“Galena Quality Is Our Bond
and Your Security”*



Galena-Signal Oil Company

New York

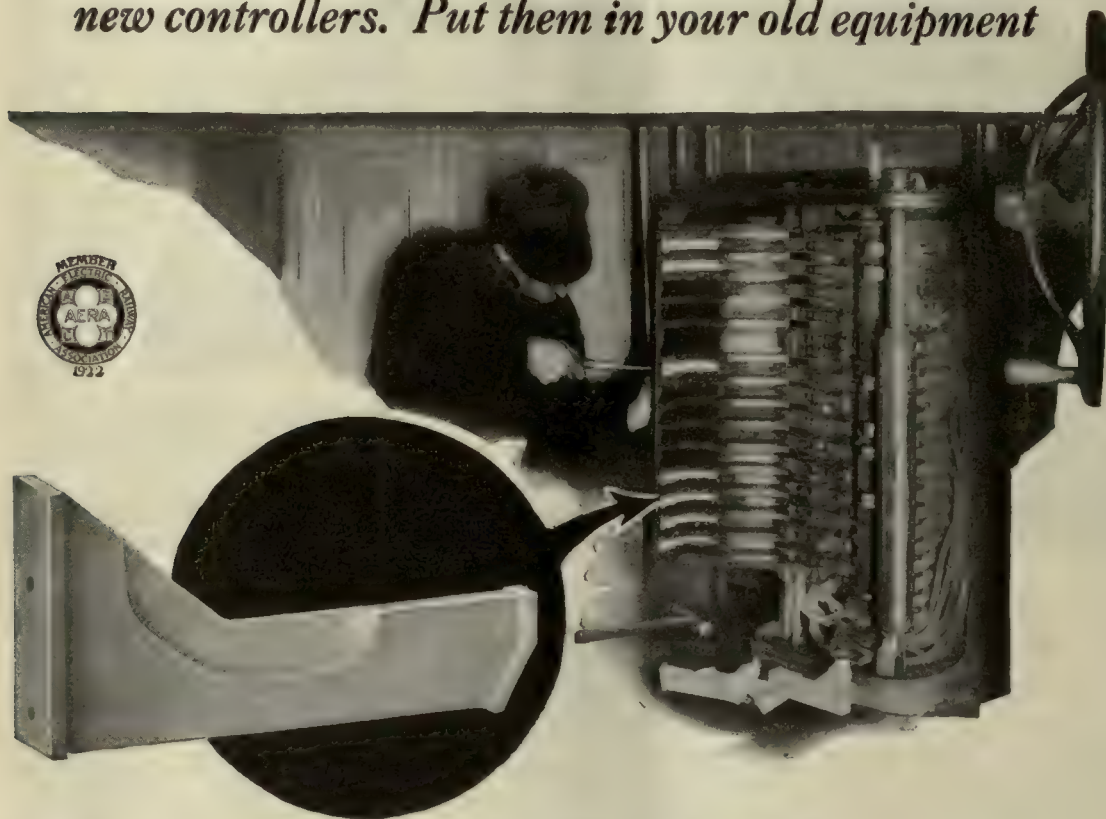
Franklin, Pa.

Chicago

and offices in principal cities



Arc suppressor plates are considered a necessary part of new controllers. Put them in your old equipment



These plates add life to the controller

G-E Arc Suppressor Plates are an auxiliary to the controller arc deflector. They are installed opposite the fingers where there is the most arcing, to shorten the time for disrupting the arc. This is accomplished by narrowing the arc passage, which increases the resistance and the cooling effect of the arc by decreasing its cross-section. The result is less burning of the controller fingers, segments, and arcing plates.

Modern controllers are now equipped with arc suppressor plates. They give better, longer service and require fewer repairs and less frequent inspection.

These plates are inexpensive and can be used to advantage on any G-E controller having individual-finger blowouts, such as the K-34, K-35, K-36 and K-64. It takes only a few minutes to install them.

Try them and see the difference.

General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors

HENRY H. NORRIS, Managing Editor

C. W. SQUIER, Associate Editor

CARL W. STOCKS, Associate Editor

G. J. MACMURRAY, News Editor

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PAUL WOOTON, Washington Representative

ALEXANDER MCCALLUM, British News Representative

ROBERT M. HAIG, Special Consulting Editor

Volume 59

New York, Saturday, April 1, 1922

Number 13

A Large-Scale Application of Machines in Track Construction

FEW electric railways have the opportunity for wholesale reconstruction that has been presented to the Toronto Transportation Commission during the past eight months. Also, and in some ways fortunately, few are obliged to do so much work with such a short period available for preparing and executing plans. The circumstances will recall to the old timers the situation in the '90s, when the streets of all of the important cities in the country were torn up incident to electrification of the erstwhile horse and cable railways.

The performance in Toronto, of course, differs from those of the early days in the large substitution of machines for men. Then labor was cheap, while machinery was scarce and dear. Now most of the energy-consuming operations are, on progressive railway systems, being performed by means of apparatus driven by electric, steam or gasoline motive power.

The work performed during the latter half of 1921 in Toronto was so great in extent that it has taken several months to evaluate it and check the data. The results of the study of the accomplishment, made by members of the ELECTRIC RAILWAY JOURNAL staff, are given in *extenso* this week. Their study has emphasized the importance of the position now occupied by track standards, especially those of the American Electric Railway Association. This should furnish encouragement to the faithful engineers who for years have lavished time and energy on the work. To the availability of these standards, combined with the possibility of applying them with the aid of machinery, must be assigned a fair share of credit for the success of the Toronto rehabilitation program.

Wanted: Some Old-Fashioned Selling in the Railway Field

TWO reasons prompt this comment. One is that the salesmen of this paper bring in the report too frequently that a manufacturer is saturated with the idea that the electric railway field is dead, that it is a waste of effort and money to cultivate it further, and that if any orders were placed the money to pay for the supplies would be lacking. The other reason is that within the last thirty days three prominent executives in well-separated parts of the Middle West, without any leading questions to bring out the statement, have declared that the salesmen who are calling on them these days seem to have forgotten they are out to sell. As one of these executives put it, "You make one harsh remark to them about their product and they are all done; they immediately get away from the business of their call or make preparations to get out as gracefully as possible."

These two things go together and bear joint treatment. How can a salesman be expected to go out and

do a real job of selling when the support of his boss is undermined with pessimism? The salesman's reports are expected to be just what he turns in—expense accounts—and, conversely, the salesman is not concerned at having to turn in reports of no sales, for he knows these are expected and so he doesn't get down to real old-fashioned selling.

The only thing wrong is that these "Gloomy Guses" are asleep; their pessimistic attitude of mind has not permitted them to see the changing condition of the industry. For not in five years have there been greater signs of activity in the electric railway field, nor a better average credit standing. The industry is gaining substantially in financial soundness and the news pages of this journal are full of reports indicating better margins between gross earnings and operating expenses, dividends resumed or good prospects of them, and large programs of betterment. One has only to read to be convinced, and the supply members of the industry are urged to peruse the pages of the ELECTRIC RAILWAY JOURNAL since the first of this year. The signs of the times are truthfully reflected there and manufacturers and salesmen will do well to read the business paper of their industry as they ought to if they would be alert to the rapidly changing circumstances and ready to capitalize them.

Chicago Is Good Location for the 1922 Convention

CHICAGO has been definitely selected as the location for the convention of the American Electric Railway Association this fall. Much sentiment throughout the country, particularly in the West and Southwest, was inclined toward a central location this year, and concurrence with these wishes and the central location itself should result in a very large attendance. For Chicago now has admirable and adequate facilities for this convention with the extensive exhibits and various simultaneous meetings and many social events, and also has ample hotel accommodations. Both exhibits and meetings will be held on the wonderful Municipal Pier, which extends nearly a mile out into Lake Michigan. It has the advantage, in a way, of being located somewhat away from the loop district, which will tend to keep the whole convention attendance together all day and isolated from distractions. Yet it is within walking distance of Chicago's newest and finest hotel, the Drake; and street cars, motor buses and Chicago's famous Yellow Taxis make the pier only a few minutes removed from the loop hotels.

October weather in Chicago is almost invariably delightful, and the weather man has agreed to fix up a concoction that will insure fair weather for the first week of October this year. Aside from the convention proper, Chicago holds forth other important business attractions. It is the home of the world's largest street railway system, which offers a host of things of particular interest for study. There is an extensive ele-

vated railroad system. There is the North Shore Line running between Milwaukee and the Chicago loop, over which no interurban operating men who attend the convention should fail to ride if they would see a most impressive object lesson of what an electric railroad can be. Then there is the opportunity to study the newer phase of the business—motor bus operation, as carried on by the Chicago Motor Bus Company, the Depot Motor Bus Lines, Inc., and other smaller bus companies in suburban and interurban service.

So with the most accessible place in the country as the meeting point, with a most attractive meeting place and exhibits assured, this ought to produce the largest attendance ever recorded at an A.E.R.A. convention. It is anticipated, also, that exhibitors will be very favorably impressed with the unusual transportation facilities and general ease of handling machinery and material and equipment to and from their spaces on the Pier. The task now set is to insure a good program and then advertise it well so that the convention may be a great success in point of accomplishment and breadth of influence.

How to Get Rid of the Jitney

THE jitney has often been called a product of hard times. It is therefore not surprising that during the present season of unemployment jitneys have increased in a number of places. In most cases they are purely piratical in that they confine their services to the profitable hours and short hauls in a city, leaving the longer hauls and less profitable hours of service to the railway. It is also true that in many, if not most, cases the jitneys are unsanitary and disregard most of those requirements, such as responsibility for damages, which have been accepted for centuries as obligatory on common carriers. Nevertheless they get considerable business, even at a fare which is sometimes slightly more than that charged on the parallel trolley lines. The trouble is not one to which the railways only are liable. Legitimate bus routes are subject to this form of attack.

A consideration of what the jitneys supply which is absent from the trolley service will help in determining what remedies are available. The case of the bus line will be considered later.

One advantage of the jitney is undoubtedly frequency of service. A would-be passenger in a hurry is apt to take the first conveyance which comes along, whether it is a jitney or a car. The second advantage is speed, possible because of the smaller number of stops. Then the jitney will undoubtedly get some special business where it does not operate over the exact route of the trolley line.

There are four principal ways by which the jitney can be combated. No one is always sufficient but it must be combined with one or more of the other methods.

The first of these is restrictive legislation. The unfairness of allowing a tax-free vehicle to take the best part of the business and requiring the tax-burdened carrier to haul the long-distance passengers, as well as the neglect by the ordinary jitney of maintaining schedules, paying damages and carrying out other requirements associated with common carriers, may be shown. Some companies have gone so far as to give an object lesson of the necessity of making the choice between

the two modes of travel by shutting down the trolley service, as in Augusta now.

The second method is to improve the trolley service, particularly in the way of higher speed and more frequent service. Much more can be done in this way than is often realized, especially by companies which have not introduced one-man car operation with high-powered motors so that they can accelerate quickly. Here also there is opportunity for the transportation engineer to show his ability to speed up car service by changes in routing, introduction of island platforms, improvement in traffic control, checking up schedules, etc. For meeting jitney competition the skip stop is probably not so desirable as the other means mentioned for speeding up the cars. With one-man cars the smaller number of stops required brings about largely the same results as the skip stop, yet offers the same advantages of convenience to the passengers as the jitney.

A third method for combating jitneys, which has been employed to advantage in certain places, is the weekly pass. A large corporation furnishing transportation service in all parts of the city is obviously in a far better position to offer a worth-while pass than a single jitney operator or even a group of them. In consequence, the trolley line gets all the business not only of the passholders but also of those who may accompany the passholder on his trips.

The fourth means by which companies have attacked the jitney situation is by the operation of a bus service themselves. This can be done to advantage in some circumstances, but is hardly advisable where there is no restrictive legislation against competition, because it would substitute a responsible bus service for an irresponsible one, and the company would probably lose money on both services. When, however, the authorities recognize the necessity for a co-ordinated service, the offer of the railway company to operate a bus on a route not covered by a trolley line may keep out a competing bus service.

Where jitneys raid the earnings of responsible bus lines, obviously the three remedies first mentioned are equally applicable.

Small Motor Cars for Use in Work on Track and Line

THE men who are responsible for the track and line maintenance on electric railways have to some extent and for some time appreciated the value of using motor cars and trucks for emergency repair work. The use of small automobiles or motor-cycle cars for other maintenance work is also increasing. The motor cycle with side car has apparently solved the track-greasing problem in Tampa, Fla.; and a sanding or salting car has proved to be a real labor saver for the New York State Railways at Utica, N. Y. The Brooklyn Rapid Transit Company uses a light truck effectively in connection with a portable welding outfit. The chief advantage in the use of these cars lies in their ability to hurry from point to point, wherever their service is needed, by the shortest route and without regard to car operation. Also the use of a self-propelled car conduces to better work because, where men travel from point to point on passenger cars, their work is sometimes done hurriedly in order to permit them to catch the next car.

The saving made in labor resulting from the use of the small cars is easily sufficient to pay the cost of operating and maintaining them.



TYPICAL FINISHED TRACK CONSTRUCTION IN TORONTO—INTERSECTION AT QUEEN AND CHURCH STREETS

Expediting Track Construction in Toronto

Although the Transportation Commission Had a Late Start on Its Big Rehabilitation Program, Rapid Progress Was Made on the Work Until Winter Set In, Due to the Advance Standardizing of Materials and Procedure and the Extensive Use of Machinery

ON SEPT. 1, 1921, the Toronto Transportation Commission* took over the property of the Toronto Railway and also the Civic Railway lines, previously operated by the city government. The single-track mileage of the Toronto Railway was approximately 143 and that of the Civic Railway 22, a total of about 165 miles. With the exception of about 15 miles of single track, which will ultimately become the property of the city, the commission now operates all of the electric railway lines of the city.

The accompanying map shows the track layout of the city system when it was taken over. The total mileage already mentioned includes 75 miles of double track and 14½ miles of single track, with a rather elaborate system of special trackwork for looping and turning back cars in the downtown district. The commission inherited a track rehabilitation job which was of great magnitude for two reasons: First, on account of the unsettled conditions of the past two years incident to negotiations between the city and the Toronto Railway, the track had been allowed to run down; and second, the standard devil strip width of the Toronto Railway was

only 3 ft. 10 in., which was too narrow for operation of cars of the modern type which the commission planned to use. On the Civic Railway the devil strip width, in conformity with a recent civic by-law, was 5 ft. 4 in. and this was adopted as standard throughout. This will give a clearance between new cars of not less than 12 in. In this connection it may be noted that the Toronto Railway, in order to operate a few wide double-truck cars, had to offset the bodies on the king pins to overcome danger of side-swiping of passing cars.

Four months before the commission took over the railway lines, it appointed A. T. Spencer, formerly on the engineering staff of the Montreal Tramways, as engineer of way. Mr. Spencer immediately set about the building up of an engineering organization, as shown in the diagram on page 555, and developed a system of standard specifications and procedure. A special section to handle excavation and concrete work was organized under the direction of A. E. Gibson, a prominent Toronto engineer who specializes on concrete work. As far as possible the standards of the American Electric Railway Association were adopted. The effectiveness of this organization is shown by the fact that it succeeded in laying 12 miles of track extensions and additions, including car-house yards, and rebuild 18



PAVING GANG GROUTING GRANITE BLOCK PAVING

*The Transportation Commission consists of three members. P. W. Ellis is chairman, the other members being George Wright and F. R. Miller. The general manager is H. H. Couzens and the assistant manager D. W. Harvey. The headquarters of the commission are at 229 Yonge Street.



Tearing Up Old Car Track in Rehabilitation Program in Toronto



No. 1—Rail and derrick car delivering rail along track slated for rehabilitation.
No. 2—Temporary shunt track to divert traffic during reconstruction.
No. 3—This steam hammer is doing duty as a pavement breaker.

No. 4—Pneumatic chisels used where big breaker might disturb subsurface structures.
No. 5—Some heavy work for the steam shovel.
No. 6—Rented trucks were used in removing spoil.

No. 7—The track was taken out in chunks for salvaging. The sections are taken to nearby yards for this purpose.
No. 8—This complicated special track-work will soon be cut up with the acetylene torch and carted away.



OUTLINE MAP OF TORONTO, ONT., SHOWING RAILWAY LINES NOW UNDER CONTROL OF TORONTO TRANSPORTATION COMMISSION

les of track, much of it under traffic, including more than 100 pieces of special trackwork, during the last four months of 1921. The nature of the special trackwork construction is indicated in an accompanying table.

Within a few days after the commission took control of the railway lines, actual construction was begun. The force was gradually increased until on Oct. 20 it reached its peak. On that day there were twenty-three men under way, employing 2,754 men in addition to the regular operating force, 112 teams and 141 motor trucks. This personnel does not include the necessary field and office engineering construction forces.

WHAT THE REHABILITATION PROGRAM INVOLVES

As will have been inferred from the figures already given, the task in front of the way department on Sept. 1 was a staggering one. Each of the numerous jobs would, under ordinary conditions, have been large enough to be of special interest to track engineers. Taken as a whole, the job is almost bewildering. Here are just a few of more than thirty large jobs substantially completed in the first ten weeks of work: New double-track line on Coxwell Avenue from Queen Street to junction with Toronto Civic Railway, 2,900 ft. Intersection at Coxwell Avenue and Danforth Avenue, of solid manganese steel, being a double-track three-part wye. New double-track line on Bathurst Street from Dupont Street to connection with Toronto Civic Railway, equivalent to 5,564 ft. of single track. Rehabilitation of northbound track on Church Street from Queen Street to Dundas Street, 1,250 ft. of new single track. Rehabilitation of double track on Yonge Street from Front Street north to Carlton Street, 4,396 ft. Rehabil-

TYPICAL PIECES OF SPECIAL TRACKWORK IN TORONTO 1921 PROGRAM*

(See map for location of these pieces)

Location	Details of Special Trackwork	Shipping Weight in Pounds
Danforth and Coxwell	Double-track three-part wye.....	85,700
Queen and Coxwell.....	Double-track three-part wye.....	87,860
Gerrard and Coxwell.....	Double-track right-hand branchoff.....	38,090
Broadview and Danforth	Repair pieces.....	36,040
St. Clair and Vaughan...	Single-track wye from double track.....	46,700
Danforth and Hillington.	Single-track facing wye.....	35,850
St. Clair and Wychwood.	Double-track three-part wye.....	83,740
Church and Queen.....	grand union.....	136,920
Queen and Victoria.....	grand union.....	158,560
Bloor and Yonge.....	grand union.....	166,370
Dundas and Ossington...	Double-track crossing.....	47,060
Gerrard and Coxwell.....	Additional curve.....	23,950
Terrauley and Albert....	Left hand single-track branchoff from double track.....	18,320
Louisa and James.....	Right hand single-track branchoff from single track.....	15,770
Queen and Yonge.....	grand union.....	170,380
Dundas and Broadview...	Double-track three-part wye.....	88,060
Reverse curves Dundas and St. Patrick.....	.....	23,720

* All solid manganese switches, mates, frogs and crossings.

itation of 1,800 ft. of track on College Street between Spadina Street and McCaul Street, with new rails and widening of devil strip.

GETTING READY FOR SEPT. 1

Preparation for the activities of the fall involved: (a) Preparing specifications for track, track supplies, rails, special trackwork, etc. (b) Laying out a schedule of procedure. (c) Providing personnel and tools for carrying out the program. (d) Arranging for material storage yards and transportation to prevent delay.

Soil conditions in Toronto rendered two types of track construction necessary, one for use on a firm soil foundation and the other for locations where a sub-base was necessary. A. E. R. A. grooved girder rail weighing 122-lb. per yard was selected as standard for

the track in streets, while 108-lb. grooved girder and 7-lb. A. S. C. E. T-rail sections were adopted for the carhouses and storage yards.

Three standard cross-sections were provided to cover the different conditions of foundation and paving. These cross-sections are reproduced, together with a digest of the specifications on page 554. They will be seen to follow A. E. R. A. standards in general.

For the concrete foundation, types 122-C.A. and 122-C.G. track, an aggregate of trap rock was specified so as to give a tough and durable concrete. It is expected that this foundation will be permanent. The concrete which is placed between the ties has a softer aggregate. It is separated from the base slab by a cushion of dust and fine stone.

Specifications for special trackwork, rails, etc., have not been reproduced. All of these were fully standardized, however.

Three types of special trackwork were provided: Type A, solid manganese switches, mates and crosses, with class No. 1 rail.* Type B, solid manganese switches and mates with frogs and crossings of steel castings, having manganese inserts at the points receiving greatest wear, with class No. 1 rail. Type C, solid manganese switches with mates, frogs and crossings of rolled rail arms bound together with cast-iron or cast-steel bodies, having manganese inserts placed at the points receiving greatest wear, with class No. 1 rail. Provision is made in a complicated layout where type B or type C construction is called for, and it is found that the length of arms on any individual piece is insufficient to permit the proper use of manganese inserts with plate clearance of at least 9 in. from the end of the arm, for the construction of the whole or part of the piece of solid manganese steel.

Under the specifications for cast-steel construction with manganese inserts and iron or steel-bound construction with manganese inserts, it is interesting to note that provision is made for construction in conformity with the latest recommended specifications of the A. E. R. A. for each class of construction, except that the general conditions as given in the commission's

rail has this chemical composition: Carbon, 0.60 to 0.75 per cent; manganese, 0.60 to 0.90 per cent; silicon, not more than 0.02 per cent; phosphorus, not more than 0.04 per cent.



"CLOSE-UP" OF DOUBLE-TRACK CONSTRUCTION WITH CRUSHED STONE FOUNDATION. ABOVE, CONCRETE PAVING BASE IN PLACE; BELOW, TIES TAMPED READY FOR POURING OF PAVING BASE

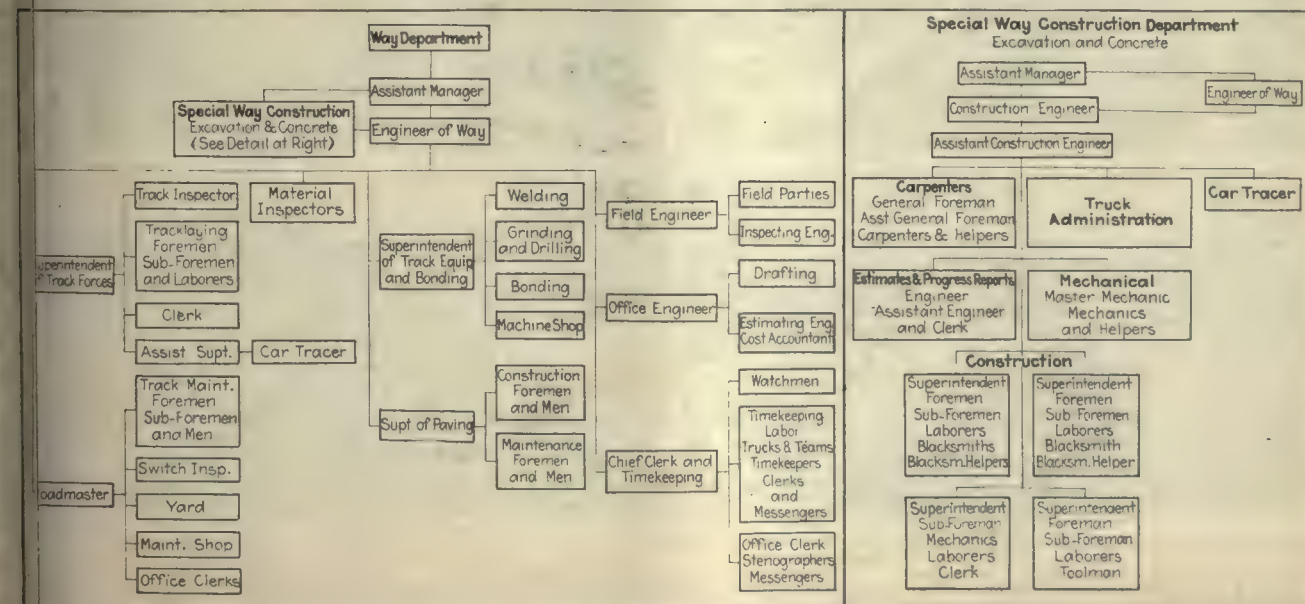
specifications shall apply as far as possible under the conditions governing the individual layout.

As to ties, the commission's specifications permit the use of white oak, cedar, jack pine, tamarack, hemlock and long-leaf 90-per-cent-heart Southern yellow pine. Pole ties are acceptable excepting those made from oak or from Southern long-leaf yellow pine. For special trackwork ties, the only woods acceptable are white oak, rock elm, chestnut, hemlock and long-leaf 90-per-cent-heart Southern yellow pine.

SCHEDULING WAS AN IMPORTANT ELEMENT IN THIS WORK

With so many jobs to be done simultaneously, and such large forces to be handled, unusual care had to be given by Mr. Spencer and his associates to the scheduling of the numerous operations.

As far as the general trackwork was concerned, it could be considered best in connection with the several operations involved as follows: (a) Wearing surface removed. (b) Concrete broken. (c) Grading done. (d) Slab poured (or crushed stone foundation placed and rolled). (e) Rails laid. (f) Track lined and surfaced. (g) Joints completed. (h) Base poured. (i) Wearing surface laid.





No. 1—Loading and measuring machines at Coxwell Avenue yard.

No. 2—This locomotive crane is kept busy at Coxwell Avenue yard.

No. 3—A group of labor-saving machines at Bathurst Street yard.

No. 4—One of the batch boxes used in transporting mixed concrete materials.



Storing and Handling Track Materials in Toronto



No. 5—Laying the drain in a double-track trench.

No. 6—The mixer at work distributing concrete base in double-track trench.

No. 7—Track blocked up to permit pas-

sage of cars while concrete base is being poured.

No. 8—Track on temporary blocking with concrete sub-base in process of hardening.

No. 9—A temporary track crossing made

of old T-rail with planking held in position by clamping with tie rods.

No. 10—Track on crushed stone foundation ready for pouring of concrete pavement base.

Toronto Track in Various Stages of Construction

By means of a progress chart form, such as that reproduced on page 558, it was possible to estimate about how fast the work could be done. As the work was actually done, it was represented, day by day, on the progress chart by means of shaded rectangles like those reproduced.

While the special trackwork jobs were more difficult to estimate, every effort was made to schedule this work so that the maximum number could be completed before heavy frost set in.

HOW THE TRACKWORK WAS ORGANIZED

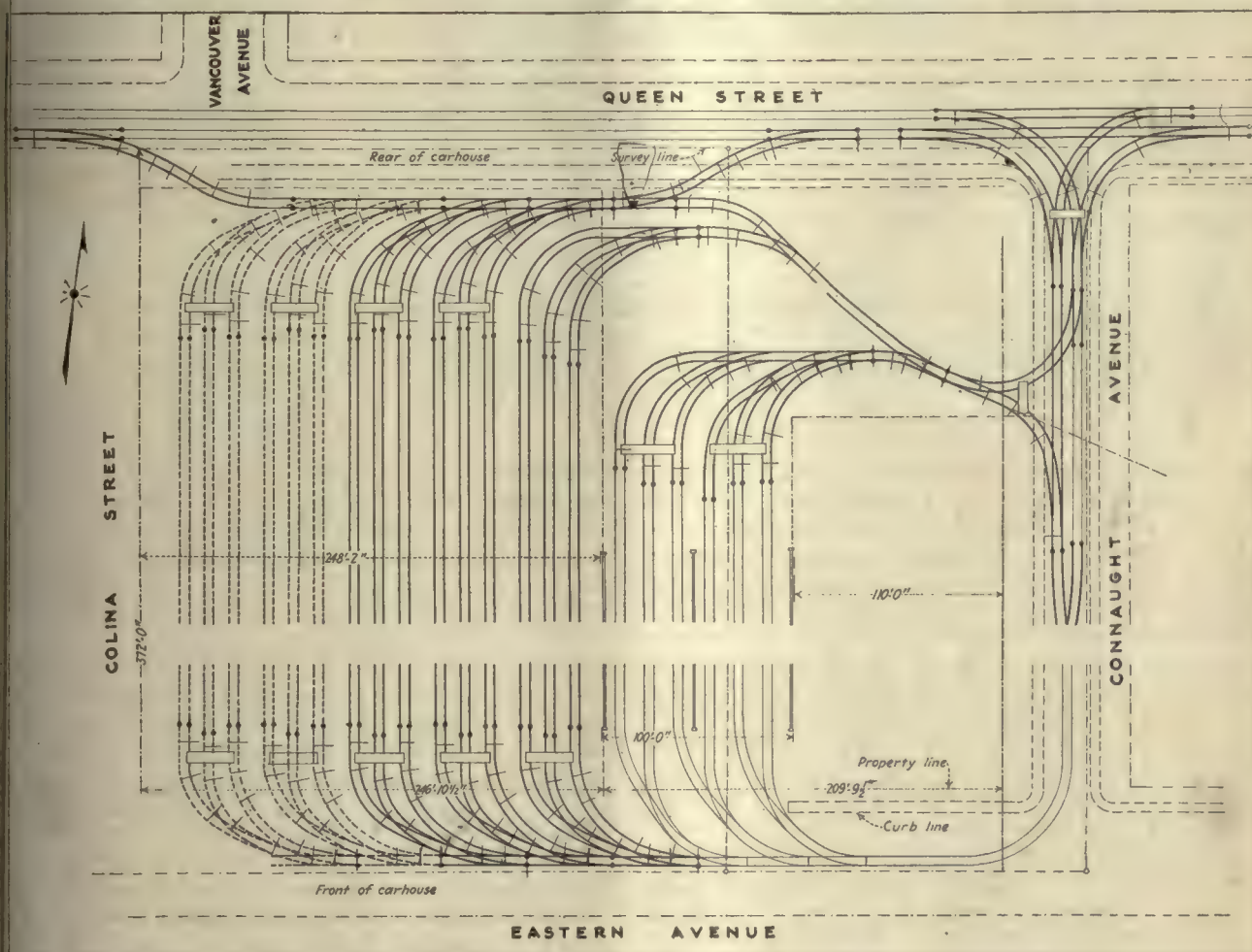
Mention has already been made of the general personnel of the special way department organization. Now, as to the way in which the actual construction

watchman service; a fourth is responsible for the sufficiency of supplies of materials and for their delivery as required by the track forces.

MECHANICAL DEVICES PROVIDED TO SAVE LABOR

The way department could not have performed the difficult task assigned to it without liberal provision of mechanical devices for performing every possible operation. These machines can best be considered in connection with the functions they were called upon to perform. The series of functions may be followed from the materials yards to the finished track.

In the materials yards, of which there were several, locomotive cranes with 50-ft. booms and clamshell buckets were provided to shunt and unload steam railroad



GENERAL TRACK LAYOUT AT THE RUSSELL CARHOUSE

was carried out. A number of track gangs were provided, each with its special duty. These gangs and their functions were as follows: Gang A does all excavating and concrete work, and all delivery of material except rails. Gang B does track laying, tamping and surfacing, and when necessary blocks up the track for traffic. Gang C does all paving and arranges track drains and connections with the city sewers. Gang D delivers tangent rails and makes changes and repairs in special trackwork. Gang E delivers blocking as needed, having for this service a Ford 1-ton delivery wagon.

The field engineering work is divided as follows: One engineer is responsible for lines and grades; a second supervises bonding, welding and grinding; a third attends to material requisitions, time keeping and

cars loaded with stone, gravel and sand. Brownhoist derricks were also provided for handling rails and special trackwork, both in the yards and on the work. Liberal numbers were also provided of Barber-Greene loading machines for lifting sand, crushed stone, stone dust, etc., from the piles and delivering them into a measuring hopper or chute for loading into trucks.

For transporting materials from the yards to the job, work cars and various forms of truck are employed. The latter are in most cases hired from local trucking concerns.

CONCRETE MATERIAL MIXED AT YARDS

In order to simplify the work at the concrete mixers, concrete materials are proportioned at the yards by means of the loading machines. The materials are

TORONTO TRANSPORTATION COMMISSION									
PROGRESS CHART, TRACK CONSTRUCTION, YONGE ST - CARLTON ST. TO BLOOR ST.									
0 500 1000 1500 2000 2500 3000									
ST. BLOOR ST. HAYDEN ST. CHARLES ST. KABELLA ST. GLOSTER ST. DUNDAS ST. WELLESLEY ST. NAITLAND ST. ALBANY ST. GREENVILLE ST. COLLEGE ST. CARLTON ST.									
A	WEARING SURFACE REMOVED	S.Y.S.	500	1200	700	1200	700	1500	
		E.T.R.	Oct 28	Oct 21	Oct 16	Oct 25	Oct 24	Oct 23	
B	CONCRETE BROKEN	S.Y.S.	100	1000	700	1200	700	1500	
		E.T.R.	Oct 29	Oct 28	Oct 21	Oct 25	Oct 24	Oct 23	
C	GRADING	S.Y.S.	1000	1000	1000	700	400	400	1300
		E.T.R.	Oct 29	Oct 28	Oct 21	Oct 26	Oct 25	Oct 24	Oct 23
D	SLAB POURED	S.Y.S.		1900	600	700	1600	1000	
		E.T.R.		Oct 29	Oct 28	Oct 21	Oct 26	Oct 25	
E	RAILS LAID	LIN. FT.	250	600	700	600	500	250	
		E.T.R.	Nov 2	Nov 1	Oct 31	Oct 29	Oct 28	Oct 27	
F	TRACK LINED AND SURFACED	LIN. FT.	450	400	750	550	750		
		E.T.R.	Nov 3	Nov 2	Nov 1	Oct 31	Oct 29		
G	JOINTS COMPLETED	LIN. FT.	350	650	500	700	700		
		E.T.R.	Nov 4	Nov 3	Nov 2	Nov 1	Oct 31		
H	BASE POURED	S.Y.S.		2500		1200	1200	900	
		E.T.R.		Nov 3		Nov 2	Nov 1	Oct 31	
I	WEARING SURFACE LAID	S.Y.S.	900	1200	1200	1200	700	600	
		E.T.R.	Nov 1	Nov 3	Nov 4	Nov 3	Nov 2	Nov 1	

TYPICAL TRACK RECONSTRUCTION PROGRESS CHART

handled in batch boxes of 33 cu.ft. capacity, two of which form a load for one motor truck. The batch boxes are bottom opening, so that the materials can be dropped directly into the concrete mixer hopper by means of a boom on the mixer. The bags of cement are laid on the batch boxes at the yards, and are emptied into the boxes while the batch-box trucks are in transit between the yards and the work. On the street, the first task is to loosen and remove the paving. Three methods are used for breaking track and pavement foundations: (1) By means of a drop-hammer in leads on the boom of a steam shovel; (2) by means of a steam hammer mounted in leads on the boom of a steam shovel, and (3) by pneumatic tools.

After the material encasing the track has been loosened, the track is jacked up and the rails, when "scrap," are cut off by means of an acetylene torch so that the track can be removed in sections by crane and



TRACK DRAIN IN POSITION READY FOR PAVING

truck to nearby yards for storage and salvaging. In many cases openings were made in the paving, jacks were introduced and the whole track structure was jacked up off the ties. After the paving blocks had been removed, the show was able to handle all excavation without the use of the breaker.

The next step in construction is the excavation of the roadbed, which is done by means of $\frac{3}{4}$ -yd. steam shovels. Three of these are employed two of which are mounted on wheels, and the other on caterpillar treads.

After the shovels have completed their work on the trench the latter is trimmed to line and grade by hand if a concrete base is to be used, and is ready for the concrete sub-base. The concrete is mixed and poured by means of Foot mixers in 21-cu.ft. batches. These mixers are mounted on caterpillar treads and are steam driven. As previously explained, the materials are

transported dry, in batch boxes, from the yards. The cushion is then spread on the sub-base, the ties are laid, the rails strung and spiked, etc.

The 122-S-G-type track does not require careful trimming of the trench and the crushed rock is spread and compacted to a depth of 9 in. in two rollings.

The joints are made by first tightening up the plate with four bolts. They are then seam-welded top and bottom by the use of the metallic or carbon arc. These plates are chamfered to provide suitable grooves for the welding materials. After the joints are welded, two of the bolts are removed. The joints not welded are electrically bonded by means of No. 0000 bonds with metal terminals.

The work in Toronto was considerably complicated by the fact that so much of it had to be done under traffic. Of course, as the commission had control of most of the trackage in the city, it was possible to divert much of the traffic to adjacent lines when a stretch of street was needed for track rehabilitation. Temporary track was laid in some cases. To secure sufficient time for the hardening of the concrete base, in some cases the following expedient was adopted:

After the trench had been finished, the rails were strung with temporary joints on alternate ties, the latter being blocked up to approximate position. On the top of each pile of blocking a wedge was inserted under the tie, partly to permit adjustment and partly to provide for convenient knocking out of the top blocking when desired. The concrete base was then poured, and traffic over the track was permitted while the base was setting. The alternate ties were then tamped up on the cushion and the blocking was knocked loose, leaving the track resting on the ties. The cushion material was then distributed, the remaining ties placed in position and under-tamped, the paving base poured, etc.

Safety Committee Reduces Accidents

With the Assistance of Safety Organization Little Rock Reduces Accident Charges in 1921 to Nearly Half of 1 per Cent of the Gross

THE efficacy of safety work when in charge of a committee devoting its time to that question is strikingly shown on the property of the Little Rock Railway & Electric Company. This system is a combined electric railway and lighting property, but this does not account for the low figure quoted above as that is the figure for the railway department. Exactly, the railway department figure was 0.56 per cent. This figure represents amounts paid out for claims and does not include the expenses of the claims department, which are about 1.1 per cent of gross receipts. For both departments the figure was slightly higher than this, owing to two accidents in the power station and one on the lighting distribution system. If it had not been for these accidents the damages account would have been less than one-half of 1 per cent of the gross.

The chairman of the safety committee is Elmer Schoggen, assistant attorney in charge of claims, and the committee is made up of one employee from the distribution department, one from the power station, one motorman, one conductor and one representative from the shops. Mr. Schoggen is a practical transportation man, having spent three years on the platform himself. This committee meets every two weeks to consider suggestions, visit the various departments where accidents might occur, and discuss methods of preventing accidents. The total claims force consists of Mr. Schoggen, Mr. Rowland, the claim agent, himself a former conductor; the company's physician and one motorman who is available for special claims inspection work. Some of the recommendations made by the committee during 1921 follow:

- A better method of carrying pikes on car-construction trucks.
- Covering holes in the boiler room floor.
- A rule forbidding a passenger from standing in the corner of the car platform near the controller.
- Improving the condition of the wash rooms.
- A rule forbidding the throwing of clothing on machinery and other places in the shops.
- Improving the operation of sanders on the cars.
- Providing guards on machinery in the shops.
- Placing new rubber mats in front of the switchboards and using the old ones in front of the cut-off saw and jointer in the car shops.
- A rule providing that the conductor can cancel his two-bell signal to start by another bell if he has to open the car door again.
- A protest to the health officer to stop passengers spitting on cars.
- Stopping boys from hanging onto the backs of cars. The method followed in this case was to notify their parents of the dangerous practice.
- The installation on each car of a box for waste for the motorman to keep windows clean in rainy weather.
- The installation of lights at the end of car lines.
- Instructions to linemen to make special efforts not to hold up cars because the cars delayed may incur accidents while speeding up to make up time.

The figures secured in 1921 are the lowest attained by the company and are attributed entirely to the work of the committee. Three or four years ago it was the custom of the company to set up an accident reserve of 8 per cent of the gross. That this has been a progressive improvement is shown by these figures: In 1919 claims paid averaged \$8.54 per 1,000 car-miles; in 1920, \$5.58 per 1,000 car-miles; in 1921, about half the latter figure.

Benefits from this attention to safety come not only directly but indirectly. Among the latter advantages is undoubtedly the knowledge by both employees and public generally that the company is making every effort to make its service as safe as possible. The result is that suits are less frequent than they were and can usually be settled out of court, if the company is liable. In fact, there has not been a judgment in court against the company in a damage suit for two and one-half years. The last was a judgment of \$100 in a \$5,000 suit.

In fact, one of the strong features of the Little Rock safety work is the policy of settling so far as possible any, or any likely liability. This has been the policy for so long and the record in the past is such that all jurors in that section of the country go into the jury box with the idea that there is not much wrong on the company's part or the case would not be in court.

Then, too, the co-operation of the company's physician in the claims work is very important. If any one is hurt, even though there is no apparent liability whatever, the company's policy is to send the physician, who takes an immediate statement. The personality of the physician has proved to be such that even though the injured person is hostile, he is usually made a friend.

In judging results of claims work, it is usually important to have a few statistics. In this regard, the average speed of the cars in Little Rock in 1919 was 8.36 car-miles per hour; in 1920, 8.46, and in 1921 about the same as in 1920. The car-miles operated are slightly in excess of 2,500,000; the passengers carried, something over 22,000,000. The population of Little Rock proper is about 65,000. In 1920, 1,723 accidents of all kinds were reported.

Japanese Railways Report

ALTHOUGH the mileage of government-owned electrically-equipped track and the number of electric locomotives and tramway cars owned and operated by the Japanese government are not large, the latest report of the Railway Administration shows that the government is awake to the possibilities of electrical operation.

Out of 2,933 locomotives owned on March 31, 1919, twelve were electric. There were 190 electric tramway cars, an increase for the year of thirty-eight. Improvement work for the preceding year included the completion of the overhead tracks for the electrified line in Yokohama.

Electric service on the Tokyo suburban lines was improved by reduction of headway of trains from fifteen to twelve minutes on the Yamato line and the Tokyo-Yokohama electric section. Time-table improvements were also made on the Nakano-Kichijoji section of the Central line just electrified, part of the electric service being now furnished as far as Kichijoji. The Tokyo-Manseibashi electric section was opened to traffic and electric trains were operated from Nakano to Ueno through the Tokyo station. Some trains were operated from Tokyo to Nakano, and from Tokyo to Kichijoji.

The fifteen power stations operated by the government produced 35,775,000 kw.-hr. of energy during the year and the output of the twenty-five substations was 31,495,000 kw.-hr. The average cost of the former was 0.0333 yen (1.67 cents at par of exchange) per kilowatt-hour and of the latter 0.0183 yen (0.9 cent) additional.

The government's electric cars made 7,892,000 miles at an energy expenditure of 2.41 kw.-hr. per car-mile

(cost 3.7 cents); while the electric locomotives made 153,200 miles and consumed 19.63 kw.-hr. per mile, hauling an average of about seven cars.

The government conducts a Central Institute for training railwaymen, with courses in railway business, technology, electricity and English. A total of 942 men have graduated since the opening of the institute in 1909, divided thus: 526, 219, 63 and 134 respectively in the sections listed. There are also five district institutes in which the instruction is largely of a practical nature. In one year there were more than 2,500 graduates from these.

The report from which the above information is taken also contains facts regarding the privately-owned (including municipal) tramways. The number of passengers carried was 983,068,275 and 2,435,847 tons of freight was moved. The earnings were 49,136,431 yen (about \$24,500,000 at par of exchange). The total mileage given above was made up of 720 miles of electric; 273 of steam; 33 of gas; 195 of horse, and 49 of man-power (rikisha) railway. The numbers and lengths of lines in these average divisions were: Electric, 69—10.4 miles; steam, 29—9.4 miles; gas, 4—8 miles; horse, 34—5.7 miles; rikisha, 9—5.5 miles.

Letters to the Editors

Improving the Electric Railway Personnel

GEORGIA RAILWAY & POWER COMPANY

ATLANTA, GA., March 21, 1922.

To the Editors:

I feel very deeply on the subject of the selection of employees, as outlined in an editorial in your March 4 issue. There is, to my mind, no question connected with the industry which should command more attention from railway operators. Below are given, as briefly as possible, our ideas and aims in this connection.

First, we are of the opinion that the designations "conductor" and "motorman" are misnomers in so far as the public is concerned. Conductors and motormen are nothing more nor less than salesmen—sellers of service. They sell the only thing we have to sell, namely, street car rides. Upon the manner in which they sell these rides—the smooth operation of the car, the courteous and careful handling of passengers and the agreeable willingness to serve—upon these things depend the satisfaction we will render our customers. Upon them rests in large measure the good will we are going to receive from these same customers, constituting the public who cannot now, and never could, "be damned." We don't believe that the American public is so much concerned about one or two cents additional fare as about quick, safe, courteous and comfortable car rides. And these "service salesmen" are the men who furnish such rides, or else they fall down on the job and furnish an unsatisfactory service. Therefore, since so much depends on the personnel of our trainmen, we believe that the highest type of men available for the wages paid should be employed for the positions of salesmen. To this end we have entirely reorganized our employment and instruction department and are working toward a higher goal in the matter of personnel.

Assuming that the applicant is of sufficiently reasonable intelligence for the position of salesman (and by

process of strict examination and elimination we ascertain this before considering his application), we think it equally important that he be physically fit. This man, if employed, is going to do business with the rich and the poor, with smart people, foolish people, ignorant people and all sorts of cranks. He must deal with the good natured and ill natured. He meets them all daily and has perhaps a wider assortment of customers than any other salesman in the world. In addition to this, the operation of his car through the busy, crowded thoroughfares of a city requires physical as well as mental alertness; the proper brain and muscle co-ordination to cause him to act, and act quickly in case of emergency. How many customers have been offended by some grouchy conductor, whose ill nature could be probably traced to poor eyesight and resulting headaches, or possibly to defective teeth? How many accidents have been caused by the defective eyesight of the motorman and his inability properly to judge distances, or possibly by a slightly defective hearing (which he has kept secret) and which caused him to miss his signal bells? And who knows but what that same customer who was offended by the grouchy conductor may sit on the jury in the damage suit resulting from the accident caused by the physically defective motorman? Many a conductor naturally of even temper and good judgment has developed a surly, crabbed disposition because he was physically ill and didn't know it. Many a motorman with a previous clear accident record has spoiled it by reason of his own physical ailment of which he was unaware.

We by no means put the physical above the mental qualifications of applicants, but under our system of selection, which insures a satisfactory mental fitness, we are giving particular attention to physical requirements. We are now finishing our first annual physical examination of every trainman in the service, an examination which extended to the division superintendents. The company pays the nominal fee charged by the doctor, and feels amply repaid from the results already obtained. The examination (the same as that used for applicants) is very rigid, including heart and lung tests, blood pressure examination and urinalysis. We have found some of our older employees suffering from high blood pressure and in immediate danger of paralysis. Such men have been laid off and required to take treatment in the way of diet, etc., and they are being paid sick benefits by our relief association, an organization organized and supported by employees themselves. Others have been found with bad teeth, responsible for and liable to cause serious physical ailments. To meet this, we have established a dentist at our transportation headquarters, and by reason of the large volume of work he is enabled to make comparatively low prices on cases handled among our men. The charges are deducted in reasonable monthly installments from the employees' wages. No single thing we have done recently has met with more favor among our trainmen than the introduction of "industrial dentistry" for their benefit, and for the benefit of their families.

As time passes there will no doubt be found men who are physically unable to perform the duties of either motorman or conductor. If such men have had sufficient length of service, and we are unable to place them elsewhere, we will retire them under our plan of annuities or pensions. Where they have not, we will use every possible means to get them into such physical condition that they can carry on their duties, or will endeavor by persuasion to have them enter some other field of work.

depending on the merits in each case. In other words, we expect to build up the physical standard among our trainmen and weed out the misfits, bearing in mind, of course, that this last must be done with justice and discrimination. And in employing new men, it is our aim to select only such types as are physically, mentally and morally fit to represent us before the public as service men.

In connection with the actual training of men, we are endeavoring to remove every trace of the taskmaster and substitute the feeling of helpful leadership. We believe we can make the man feel that the company is, after all, his best friend. We want him to know that we are just as anxious about his making a clean record as he is himself. By our follow-up methods we find men who have been with us for some little time, occasionally a long time, who have grown stale or indifferent in their work. Unless their offenses are viciously flagrant, we are bringing them back to school and trying by patient methods to "work the kinks out" and recharge them with a desire to be up and on their toes in an effort to render service—not just ordinary service, but good service—just as we should do if there were a dozen competing street railways here.

The idea, the spirit and the aim we have in mind seem to be rapidly permeating our entire body of men, and by the tactics which I have described we are getting splendid results.

In conclusion, I can only add that a motorman or a conductor is not an ordinary individual, in the sense so many have come to regard him. He is a salesman, who deals with everybody and who requires infinite tact, patience and judgment, if he is to protect his company and maintain its standards of service. And to the end that he may make a success of his work, he must have the natural requirements to begin with, he must have the right principles of duty instilled into him when he is new and in an impressionable state, and thereafter he must be encouraged when he gets a raw deal from his public (because he is going to get this anyway, at some time or other) and when things break badly for him he should have the satisfaction of knowing that his company is with him and for him. With this spirit of unity and co-operation and the proper training and guidance nothing but good results can be obtained.

F. L. BUTLER,
General Operating Manager.

Combating Jitneys by a Small Railway

DANBURY & BETHEL STREET RAILWAY

DANBURY, CONN., March 28, 1922.

to the Editors:

It may be of interest to your readers to know the effect of the elimination of jitney competition on a small street railway in the hands of a receiver. The Danbury & Bethel Street Railway is operating 13 miles of electric railway in the towns of Danbury and Bethel and 4 miles of motor bus lines. The company has been in the hands of a receiver since Nov. 1, 1917. The territory which is served by this railway has a population of about 27,000.

Jitney competition began in the spring of 1918 and continued until about May 1, 1921. The Connecticut legislature of 1921, carrying out the recommendation of Governor Lake in his inaugural message, passed an act declaring jitneys "common carriers," placing them under the jurisdiction of the Public Utilities Commis-

sion and requiring a certificate of "convenience and necessity" before a jitney could be allowed to operate, operation being over fixed routes under regular schedules approved by the commission. This act took effect on July 15, 1921, but several months before it went into effect the jitneys competing with our company ceased to operate, due largely to a routing of the jitneys under a local ordinance passed after announcement was made that street railway service would be suspended unless the jitneys were curbed. Since the law has gone into effect no application has been made by any jitney seeking to compete with our company for a certificate of "convenience and necessity." The same session of the Legislature authorized the street railways of the state to operate motor vehicles. We have had no jitney competition since May 1, 1921, and since July 1, 1921, we have been operating two lines of motor buses as feeders to our electric railway lines.

The following monthly comparative statement of gross passenger receipts for 1920 and 1921 and two months of 1922 shows just what the elimination of jitney competition has meant in dollars and cents to our little company:

	1920	1921	1922
January	\$11,644.02	\$ 9,871.02	\$14,154.05
February	9,740.27	9,000.74	12,675.71
March	8,767.72	11,284.99	
April	9,731.62	10,830.83	
May	10,052.43	11,830.83	
June	10,711.82	13,484.27	
July	13,597.01	16,543.15	
August	13,478.62	16,407.39	
September	10,895.52	14,473.68	
October	12,413.97	18,077.33	
November	8,546.52	12,567.36	
December	10,117.50	14,367.15	
	\$129,697.28	\$157,971.29	

During the first six months of 1920 we had a 7-cent fare within the limits of Danbury or Bethel, and a 10-cent fare for a through ride. Since July, 1920, we have had a flat 10-cent fare on all lines with an 8-cent ticket rate (metal tokens now being sold twenty-five for \$2). Notwithstanding the increase of fare, the first four months of 1921 showed an increase over the same months of 1920 of only \$1,103.69, or an average monthly gain of \$275.92. The last eight months of 1921 (after the elimination of jitney competition) show a gain of \$27,937.77 over the same months for 1920, notwithstanding that during six of these months the same rate of fare prevailed. This corresponds to an average monthly gain of \$3,492.22. January and February, 1922, show a gain over January and February, 1921, when we had jitney competition, but with the same rate of fare, of \$7,958, a monthly average of nearly \$4,000.

In 1920 we had an operating deficit of \$18,962.19, while in 1921 we had an operating revenue of \$17,632.39. This difference was due, of course, not alone to the absence of jitney competition but also to a decrease in operating expenses.

We are now using safety cars of the Birney type exclusively, and trying to give the maximum of service as the best preventive for any jitney in the future securing a certificate of "convenience and necessity." With the elimination of unfair jitney competition, the use of safety cars and with supplementary motor bus service on a limited scale, I believe there is a future for the street railway in our smaller cities.

J. MOSS IVES,
Receiver.

Some Features of Safety Car Design*

Author Says Good Word for Rebuilt Car—Approves Design Described by Mr. Adams—Favors Double-Truck Safety Type as to Riding Qualities and Maintenance

By HENRY CORDELL

Master Mechanic Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.

SEVERAL operators have designed and built cars which, in their opinion are the ideal. Some of us have remodeled old cars and feel that they are the last word in safety car construction, from a rebuilding standpoint. The Chicago, North Shore & Milwaukee Railroad has rebuilt some of its two-man cars and contemplates rebuilding additional cars that are suitable for one-man operation. I am of the opinion that too little thought is given to rebuilding of the cars one has, when they are adaptable to one-man operation. I believe we should ignore the amount of extra weight if the bodies are in fair condition and the electrical equipment consists of later types of controllers and motors.

There is one thing certain in my mind—that a car built under the old idea, where a little too much material was used rather than just enough theoretically to stand the service, has proved to be worthy. The average old car can be rebuilt for \$1,500 or \$2,000—a saving of from \$4,000 to \$5,000 as compared to the cost of a new safety car. Why not get the use out of it by spending a few dollars? If the old car is sold, the receipts would not go far toward the purchase of a new car.

With modern motors the power consumption is not such a great drawback, considering passengers handled on a larger car. We find on a safety car weighing around 17,000 lb. a current consumption of under 1.3 kw.-hr. per car-mile as against 2.3 kw.-hr. for a car weighing 34,000 lb. However, we can carry on this car forty seated passengers as against thirty-two on the safety car and stand a corresponding larger number, giving a better ride due to double-truck construction.

Maintenance on a safety car is of an unknown quantity as yet with a good many companies. Of course, the cost is very low the first year or so, but will it remain at this low figure of say 2 cents per car-mile after a few years? We have all heard the expression that we can afford to retire a safety car after five or six years and buy a new one. Few companies will do this, and then the mechanical departments will have some grief explaining why the maintenance costs are running up.

In order to obtain the lightest type of one-man car we went to single-truck construction. I personally feel we should have been better off if we had retained the double trucks. First of all, the riding qualities of a double-truck car are not obtained. Second, a great

deal of flange wear occurs—more than is proportional as compared to a double-truck car. For example, the wheels under a double-truck car weighing 52,000 lb. used in city service will give a mileage of 298,000, whereas the wheels under a 17,000-lb. single-truck safety car give only 80,000 to 85,000 miles. The flanges wear rapidly because nearly all track layouts built during the last twenty years have been constructed to suit double-truck cars with a wheelbase of from 4 ft. 6 in. to 6 ft. 6 in. We can't expect a car with an 8 ft. or 9 ft. wheelbase to take the same curves and special work, at a rate of speed even higher than that of a double-truck car, without showing the effects.

I note a movement afoot for increasing the weight of safety car parts that experience has taught us were too weak. We have overlooked the fact that we have heavy overloads at times, amounting to as much as two-thirds of the light weight of a safety car weighing sixteen or seventeen thousand pounds. We know this condition cannot but produce stresses which break the backbone, so to speak, of the car and cause unnecessary repairs.

The car built by the Chicago Surface Lines described in Mr. Adams' paper† is in line with my idea of a one-man car. It will be noticed that there is only a difference of 112 lb. per seated passenger in dead weight between the single-truck car and the double-truck car mentioned in the paper. This is a good figure when you consider the difference of 7 ft. 11½ in. in length and 6 in. in width, not taking into consideration the additional weight of the extra truck and motors.

The aluminum stanchions and railings make a very good installation and are easy to keep clean, require no paint, and even with a higher initial cost I am inclined to believe it would be cheaper in the long run.

I would be very glad to know final results of the aluminum pipe installation on the air-brake equipment. I have some doubt of it lasting in operation, having a tensile strength of only about one-half that of wrought-iron pipe. I believe that breaking will occur due to the vibration.

The handling of passengers in a safe, quick and economical way depends on door width, height of step, method of fare collection and the operator.

Quick handling of passengers can be accomplished safely with double doors with an opening of 23½ in. each, divided by a stanchion and railing through the center of the platform, di-

viding boarding and alighting passengers. With selective control from the operator's valve, arranged so that either door or both doors, if so desired, can be opened, both flexibility and safety are provided.

There is no reason why one-man car operation with full safety control should not be used on interurban property, particularly on branch lines where the traffic is not very heavy. The size of the car to which safety control may be applied is entirely immaterial, and it would be just as safe to operate with one man a car weighing 75,000 or 100,000 lb. as one weighing 16,000 lb.

Midwinter Convocation of Engineers in Chicago

On March 21 and 22, under the joint auspices of the Western Society of Engineers and the Chicago sections of eight national engineering societies, a general convocation of engineers was held to inform the engineers of the community about the engineering problems of Chicago now pressing for solution and the part they should take in carrying them through. In the first three sessions held on March 21 and the morning of March 22, gas and electric utilities problems were the principal questions under discussion. In the afternoon session E. J. Noonan, chief engineer of the Chicago Terminal Commission, spoke on the "Railroad Transportation in Chicago," discussing in particular the location and construction of the new terminals which are planned to improve the railroad terminal situation in Chicago. Bion J. Arnold, following on the same general topic, recommended that the street railroads co-operate to the extent of providing three through routes through the city on much the same system that is followed by the surface and elevated lines in routing cars through the loop and not merely to it as was formerly the case. A paper by Harry I. Brown, Western editor ELECTRIC RAILWAY JOURNAL and BUS TRANSPORTATION on "The Possibilities of Developing Chicago's Transportation Facilities," was read in his absence by W. W. DeBerard. This paper is printed in abstract elsewhere in this issue.

Institute of Transport to Celebrate Historical Events

The Institute of Transport of London expects to arrange suitable celebration of the centenary of the opening of the Stockton & Darlington Railway in 1825 and of the locomotive trials at Rainhill in 1829. It was at these latter trials that the famous engine "Rocket," built by George Stephenson, established the supremacy of steam engine over the then known method of steam transport, namely, stationary steam engines.

It is expected that these celebrations will be held in connection with the annual congresses of the Institute in the years in question.

*Abstract of discussion of paper by H. H. Adams at meeting of Illinois Electric Railways Association, Chicago, March 15-16, 1922.

†See issue of this paper for March 25, page 520.

Wisconsin Men Hold Liberal Views on Their Competitive Problems

Joint Convention of Electrical and Gas Associations Held in Milwaukee—The Two Associations Combined Into the Wisconsin Utilities Association—Railway Men Discuss Bus Competition and Selling Transportation and Make Inspection Trip Through Milwaukee Company Shops

JOINT sessions of the Wisconsin Gas Association and the Wisconsin Electrical Association in connection with their annual meeting in Milwaukee extended over the three days of March 22, 23 and 24. The principal business disposed of by the convention was ratification of the action of the two executive committees in uniting the electric light, railway and gas utilities of the state into one association named the Wisconsin Utilities Association. The electric railway and electric light associations combined several years ago. Of the new organization J. P. Pulliam was elected first president, he having served as president of both the gas and electrical associations during the past year. Other officers elected were: Ewald Haas, Milwaukee, vice-president; G. C. Neff, Madison, treasurer, and J. N. Cadby, Madison, executive secretary. C. R. Phenicie, Green Bay, was elected chairman of the electrical section; Bruno Rahn, Milwaukee, chairman of the gas section, and B. W. Arnold, Oshkosh, chairman of the railway section, with Dudley Montgomery, Madison, as assistant.

In his president's address, Mr. Pulliam said that more than \$50,000,000 will be spent in Wisconsin by the various utility companies during the course of this year in new construction work, extensions and improvements. A careful study given the business situation by the various utility companies has given rise to a conservative belief that from now on a gradual upturn of all industry may be expected. Since utility companies blazed the way for industrial growth, the utilities are leading the way with their expansion programs. That shows in terms of money that they have confidence in the general industrial and business outlook. Those cities in which they have been permitted to earn their just revenues will benefit from this program sooner than those wherein the rates have been held so low as to make postponement of improvements imperative because of inability to finance new work.

The public and the newspapers are beginning to investigate and discuss the situation of the utilities and their problems more thoroughly, and this, together with the liberal response to security offerings, gives our business a brighter outlook. Mr. Pulliam said that the recent sleet and snow storms which so seriously interfered with utility services and caused great damage of property generally may have their compensation in bringing forcibly to the attention of the public and the regulatory bodies the importance of the industry and the need of permitting utilities to earn sufficient return to be

able to accumulate reserve funds to meet such emergencies. The public in those cities where utility services were interrupted are loud in their praise of the heroic work done by the utilities to restore service. Many of them have written letters to the different companies telling managers they never realized before how dependent they were upon the utilities for their daily necessities, comfort and conveniences.

RAILWAY MEN DISCUSS BUS COMPETITION

W. G. Brooks, Westinghouse Electric & Manufacturing Company, served as chairman of the informal meeting of electric railway men on the afternoon of March 22, at which particular interest in the problems connected with motor bus competition was manifested. Charles E. Warwick, Green Bay, Wis., told of the passing of an ordinance in that city requiring a license fee of \$100 per year and limiting operation of buses to streets other than those occupied by car lines. The legality of this ordinance, however, had been challenged by one of the bus operators and he had succeeded in securing an injunction which prevented the city from enforcing the ordinance. The city now is planning to put the matter up to a referendum vote unless the injunction is dissolved.

Mr. Warwick said he thought the people in his community were in favor of the street railway company because it had not made the bus competition a personal matter or openly attacked it, and hence there had been no disposition aroused to help the under dog. He said he considered that high class street car service was the best way to deal with jitney competition.

F. W. Walker, general manager Milwaukee Northern Railway, expressed the thought that motor bus competition should be considered in a broad-minded way. He pointed out that the electric interurban lines had entered the transportation field after the steam roads and had justified their position by developing a new kind of service. The buses are now doing the same thing and they have a right to operate, for they represent an advance in the art of transportation. The electric railways, however, came into existence by assuming all of the obligations and regulations to which the steam roads were subject, but this is not true of the buses. Under present operating conditions they are subsidized just as much as the steam railways were when the government gave them land grants. They practically escape all except personal taxes and have the use of the highways free. Furthermore, they are not

being assessed at anywhere near their real value as personal property. For example, a truck valued at \$5,000 was subject to a tax of only \$153, total.

These matters are being brought to the attention of tax authorities. Buses and trucks should be charged so much per mile, based on capacity. Mr. Walker gave it as his opinion that the charge for buses should be $\frac{1}{2}$ cent per mile up to a capacity of ten passengers, $\frac{3}{4}$ cent per mile for a capacity of ten to twenty passengers and 1 cent per mile for a capacity of over twenty passengers. They should be required to file their schedule and report the number of trips and pay the corresponding road charge at the end of each month. Mr. Walker pointed out that while the amounts he had suggested might not be right, the principle of a charge for the use of the road on a capacity basis was. With such an arrangement in force, a bus would be carrying its just part of the public burden, and on this basis he maintained that if a motor bus operator can make a profit he should be allowed to continue in operation wherever there is a demand for bus service without regard to competition.

Speaking of the effect of truck competition on the business handled by the Milwaukee Northern Railway, Mr. Walker said that on short-haul business, up to 25 miles, the freight business of the company had stopped increasing, but the long-haul business is continuing to grow. He considered that the way to meet this competition was through frequent service. He is sending the freight forward on an hourly basis and said that this is bringing business to the company.

Mr. Walker laid great emphasis upon the view that it is wrong to consider that buses should not be permitted to operate in territory already served by an electric railway. Such a theory is not sound. If the buses can operate in territory already served and pay their proper part of the public burden, then if the electric line cannot continue in business in the face of this competition it is obsolete and ought to go out of business.

B. W. Arnold, Oshkosh, expressed the view that there is little to fear from jitney competition in city service, as it has been pretty well established that the jitneys cannot live. The competitive interurban bus, however, is a different proposition and the amount of money it earns is dependent upon how much business the electric line permits the bus to take away from it. He told of an experience with one bus line which was in competition with the electric interurban line operated by the Eastern Wisconsin Electric Company.

These buses had been operated out of the terminal cities just ahead of the interurban. They would pick up passengers at the interurban terminal and cut in ahead of the cars and delay them while the buses picked up passengers at points along the route. This practice led to a number of rather bad accidents, and some encounters between trainmen and bus operators. This all culminated finally in an ordinance in Oshkosh which required that bus operators should have a permit. The City Council thereafter issued permits to non-competitive bus lines, but not to competitive lines. Mr. Arnold then succeeded in inducing the competitive bus operators to give service into territory otherwise unserved, offering full co-operation of the interurban line in that kind of operation. This plan was carried out and railway and bus are now working together rather than in competition.

R. M. Howard, LaCrosse, Wis., expressed the belief that the old law of the survival of the fittest is going to obtain. All the railways can ask is that the bus be maintained on an equal basis of responsibility and obligation to the public and then let the best man win. The buses must expect to pay some kind of a tax to cover the destruction of the roads over which they operate.

Mr. Munger, Milwaukee Electric Railway & Light Company, told how this company has placed buses in operation over the 18 miles of concrete road between Milwaukee and Waukesha paralleling the interurban line and in competition with independent buses. The fare charged on the company's buses is the same as that charged by the independents, which is lower than the railway rate. The railway's buses are operated on the same schedule as the independent buses and are now carrying about an equal number of passengers. In other words, if the company had not started the operation of buses, the independent bus lines presumably would now be carrying double the number of passengers which they actually are hauling.

Mr. Munger spoke about one bus line which the Milwaukee company has been operating for about four years, connecting Lake Geneva with the end of one of its interurban lines and giving a service not otherwise provided. This bus line has done very well and now the company is considering the installation of bus service beyond the ends of other interurban lines, first to bring further business to the interurban lines and second to keep independent operators out. One thought that has been in the minds of the railway company in going into the bus business is the probability that the authorities would more quickly attack the railway company to force a proper payment for the use of the road, and any restrictions that resulted would, of course, apply to competitors as well. The combination of independent buses and company buses both in competition with the interurban line to Waukesha has of course

seriously affected the revenue of the railway.

N. C. Rasmussen, Wausau, Wis., said that the street railway system in Merrill, Wis., had been discontinued and three light buses substituted for the railway service. This change to buses was made as an alternative to rebuilding the railway system. Mr. Rasmussen concurred in the view of the Milwaukee company that the quickest way to bring the proper regulation of the buses is for the electric railways to get into the bus business.

B. W. Arnold expressed disagreement, saying that he thought the Milwaukee company was probably the only one in the state that could afford to fight buses with buses. He considered that the proper way to go about this was to give support to a bill before the Legislature which would bring about an equitable distribution of taxes over buses and other means of transportation. He contended, however, that the railway companies should get into the bus business to provide a feeder service for the railway lines now operating, but he thought that for the railway to get into competition with itself was just inviting the sheriff.

SELLING TRANSPORTATION

After a brief discussion of the field of the trolley bus, the discussion turned to the subject of ways and means to merchandise transportation. All who took part in this discussion emphasized the importance of good service. Mr. Burch, Waukegan (Ill.) city lines, illustrated the point by saying that in 1918, when large double-truck cars were operated on a twenty-five-minute interval, 2,000,000 passengers were carried. During 1921, as a result of an eight-minute headway during non-rush hours and a four-minute headway during rush hours, with service given with one-man safety cars, the number of passengers carried was 4,500,000. This increase was the more convincing because it had been made in spite of the closing down of the Great Lakes Naval Training Station, which had been a heavy contributor to traffic on the lines in 1918 and 1919. Jitney competition also disappeared with the improvement in service.

Dean Treat, Standard Oil Company, having for many years been a railway operator, spoke of the value of having an outsider criticize the service given by the company. He said that the man on the ground is so close to his problems that he does not realize the faults as readily as one from the outside. He spoke also of the great desirability of having superintendents and inspectors get out and ride the cars during the peak periods.

Ross W. Harris, Madison, Wis., spoke of the great improvement in public relations which comes from a public understanding of the service provided and emphasized the importance of this understanding as a merchandising asset. To illustrate the point, he reviewed the arrangement between company and city in Memphis, Tenn., and told how excel-

lently the plan in effect there, which embodies a city representative and a company representative and himself as neutral, for working out all problems in connection with the local street railway service.

Mr. Warwick, Green Bay, Wis., said that the way to merchandise transportation is first for the company to sell the business to itself and then sell it to the employees, who act as the salesmen to serve the public. Keep the merchandise for sale constantly exposed to the convenience of the public so that the people can partake of it as often as they will and be pleased. This means a smooth roadbed, clean, comfortable cars and trainmen who are courteous and appear to be real, civilized fellows. Trainmen should be taught to study their patrons just as a clerk in a store studies his customers. The one-man car operator has many duties to perform, so that he needs to be highly trained not only as an efficient operator but also how to treat people who want to buy a little of the service. One of the principal duties of the superintendent of transportation now is to revamp the minds of the trainmen who have gone through this long period of inflation and get them to know that the people of America must now be treated with consideration and given full value for the money received. The Green Bay company is using a series of car cards placed on each bulk head and changed twice a month on which the caption "Street Car Movies" appears and a short advertisement. The text of these advertisements is designed to have a good appeal to patrons and at the same time to get trainmen to conform to the same ideas.

RATES SHOULD INCLUDE DEMAND CHARGE AND HAULAGE CHARGE

F. W. Walker, in speaking of merchandising transportation, said that in addition to good service, the basis of charge should be so arranged as to take into account a demand charge and a haulage charge. He said it would be considered ridiculous to charge twice as much to haul freight 10 miles as to haul it 5 miles. The same sort of rates ought to apply to passenger haulage, for the long-haul passenger should not be required to stand the loss on the short-haul passenger. The long-haul passenger should be carried for less per mile. In working out these ideas and in trying to provide rates to meet the competition offered by the Chicago & Northwestern Railway, motor buses and private automobiles, the company has in effect the following rates: A 1,000-mile book at 2 cents a mile, a twenty-five-ride ticket at 2½ cents per mile, a single ride ticket at 2½ cents per mile, cash fare of 3 cents per mile, a monthly forty to sixty-two ride ticket with a rate graduated from 2 cents per mile for short haul to 1.65 cents per mile for the longest haul. In addition to these rates, the company also has a special clergymen's rate, special rates for conventions and round trip party rates. It makes a particular point of

having the tickets of all denominations on sale at convenient locations. In addition to the railway offices, they are sold at stores and at various points in all cities along the route, in order to make it as convenient as possible for patrons to buy transportation, the theory being that the easier it is to buy transportation the more they will buy. A 100-mile book carrying the same rate as the single-ride ticket is also provided for the convenience of farmers who board cars at crossroads and cannot buy a ticket.

Similarly, the company has made its merchandise freight rates to favor the good customers. The farmer who ships milk every day gets a better rate than the intermittent shipper. A shipment in excess of 5,000 lb. to any one consignee carries a rate lower than that for smaller shipments. There is a special commodity rate for standard packages. There is a rate for merchandise having large bulk and small weight. Rates are also provided to include collection and delivery at any point, or for haulage only. There is a seasonal rate whereby the winter cost of handling shipments is put on the winter business. The summer rate applies during the nine months from March 15 to Dec. 15. Thus the farmer who ships his milk by interurban all the year around gets a 15-cent rate for nine months and a 45-cent rate for three months, averaging a cost for the year considerably under 30 cents. On the other hand, the farmer who ships by truck all summer and falls back on the interurban in the winter pays the high rate of 45 cents, or a figure corresponding to the cost of handling his business.

Mr. Walker said that one of the things that has been very effective in bringing business to the Milwaukee Northern Railway is the prompt settlement of claims. All claims are approached by the claim agent as though the shipper would not have put in the claim if he did not have one. The company assumes that the employees are at fault and are trying to cover up. If investigation finally develops the fact that the shipper is at fault, then a conference with him is arranged and all of the cards are laid on the table and when he is informed that the company wants to pay him if he feels that he is entitled to something. Mr. Walker says that nine out of ten claims thus refused by the company are withdrawn. But if the company is in any way to blame, the claim is promptly paid and never refused. This policy has induced very good feeling toward the company and has been a strong influence in holding customers who were solicited by other transportation lines. It has the result that if a customer is thinking of quitting the interurban line, he at least gets in touch with the interurban line first, and Mr. Walker says that it is possible to make some special arrangement to hold his patronage, this is done.

No profit on the pick-up and delivery service provided by the railway at all points is charged the shipper, except

for a very small margin to cover any possible error in the estimate of costs. In making up the rate on express matter, a demand charge is included in the figure for the first 100 lb. The rate on the first 100 lb. is then higher than the rate of the American Railway Express Company, and for a small package weighing 10 to 20 lb. it is 50 per cent higher. But by making up the charge on this basis, it is not necessary to penalize the long-haul shipper to make up for the losses on the short haul. Mr. Walker says that the earnings of the Milwaukee Northern Railway, resulting from the merchandising effects of these passenger and freight rates, have shown a very rapid growth. Less than 12 per cent of the total passengers on this road pay cash fare, while more than 88 per cent are using some form of ticket.

On the morning of March 23 the electric railway men were taken to the Cold Springs Shops of the Milwaukee Electric Railway & Light Company in one of the new twenty-five-passenger White buses and, after inspecting the shops, were brought back to their hotel in one of the one-man, two-man, double-truck safety cars, of which the company

has a number in operation. Points of particular interest in the shops were the system of spray-painting cars, which has reduced the cost of painting by nearly 50 per cent. A new system of reclaiming oil that has recently been put into effect was said to be returning good oil at a cost of about 10 cents a gallon. The oil is reclaimed to within the limit of 10 per cent of the original specification and the average actually accomplished is within about 4 per cent.

Interest was also shown in a wheel lathe, which by a change in the pinion had been speeded up so that eighteen pairs of wheels are turned a day, requiring one machinist and part of the time of one helper. The same helper also assists on the wheel press adjacent. At a very well attended and much enjoyed banquet on the evening of March 23, P. A. Grau, Milwaukee, acted as toastmaster; the Rev. M. S. Rice, Detroit, Mich., was the principal speaker.

Among the papers presented before one of the joint sessions were two on the controlling elements in rate making and valuation of utilities for taxation purposes respectively. One is abstracted below; the other will be covered in a later issue.

Value of Service as an Element in Rate Making*

The Application of the Service-at-Cost Theory Is Decreased in Proportion to the Essentiality of Public Utility Service and Must Be Abandoned If It Unduly Restricts the Use of Service

BY LEWIS E. GETTLE

Member of Wisconsin Railroad Commission

THE limitations of the cost-of-service doctrine may be discussed generally as limitations imposed by the value of the service. In a sense the question of the value of the service is the old doctrine of charging what the traffic will bear. Rate and price fixing will always break down when it reaches a point where it restricts the use of the product.

The strict application of the cost-of-service theory, which has been attempted in many cases, seems to me to result in part from a failure to analyze the conditions which have led to the present development of the public utility business, and to some extent from a misinterpretation of the essential nature of that business. The most fundamental form of public utility is the public highway. Nowadays it is very rarely that we find a public highway supported on a toll basis. This public utility is supported by general taxation with no attempt to distribute the cost in proportion to its use. An effort in this direction was defeated in Wisconsin at the last session of the Legislature when the bill for assessing automobiles for highway purposes failed of passage. The vote of the Legislature may be considered an expression of the general public attitude toward the distribution of the cost of highway maintenance, and this attitude does not countenance a distribution of that ex-

pense on a cost basis. If our highways had been developed on a toll road basis it is altogether probable that we would have had a rate scheme more or less closely approximating the cost of the service. To some extent we have evidence of this in the rates on toll bridges in Wisconsin at the present time, although it must be admitted that the schedules are very imperfect. Another stage in the development of the municipal public utility is also represented by the public sewer system.

The closer the public utility service comes to being an absolute essential, not merely a convenience, the greater must be the departure from the cost-of-service theory of meeting its expenses. The modern waterworks system, also, illustrates this principle. The proportion of water rate schedules have been fixed quite largely by custom, which is merely another way of saying that they have recognized what experience has shown the different classes of service to be worth in proportion to each other. The same conditions which have resulted in the support of highways and sewer systems out of general public funds apply to a considerable extent to waterworks systems. I think it may be safely stated that when the application of cost-basis rates restricts the use of the service below the level necessary for the maintenance of public health, the cost-basis rate must be abandoned. Probably we would be safe in going much farther than this by saying that when a cost-

*Abstract of paper presented before joint meeting of Wisconsin Gas Association and Wisconsin Electrical Association, Milwaukee, Wis., March 23, 1922.

basis rate seriously interferes with that degree of development in the use of conveniences which we associate with modern civilization, the cost basis must be modified and adjusted and the value of the service must be recognized as an element in rate fixing. The past two years have given us some illustrations in Wisconsin of the limitations imposed by the value of the service upon rates for gas.

It is highly important that the public utility company distinguish between the dissatisfaction which grows out of misunderstanding or agitation and that which grows out of the limited value of the service. The first cause of dissatisfaction can almost always be corrected where it is intelligently handled. The necessities of the past few years have led to rate increases in Wisconsin for individual companies involving a great many thousand customers almost without a single complaint of the results, because the commercial relations of the companies were such that misunderstandings were cleared up and prejudices removed.

Analysis of the rate situation so that where any dissatisfaction exists the utility may determine in what degree it is due to the limited value of the service is a first essential to proper commercial relations and to the proper development of a rate schedule. Despite all that has been said in favor of the cost-of-service basis, the utility which fails to recognize that in developing its system for the service of a municipality it has assumed the obligation of serving the residents of that city in the broadest possible way.

Costs are of great importance and their complete analysis is almost fundamental to the construction of a rate schedule, but a schedule which recognized only costs would ordinarily be unworkable and unsatisfactory. A rate schedule must be based upon judgment, experience and common sense as well as upon costs. I want to stress the limitations upon the use of costs, in the belief that a realization of those limitations makes the intelligent and workable use of the costs more likely of attainment.

said she was saving all the American money she could get. Here is perhaps a case of a debased currency too slow to get well; people may soon refuse it altogether and thus hard money—gold or silver—be gradually introduced into circulation. This would, of course, involve repudiation of the national debt and industrial ruin.

In the meantime Germany is apparently enjoying prosperity; and wages, while low in comparison with ours, are constantly on the increase but people with fixed salaries are suffering badly from the depreciation of the currency. Of course, the situation is enormously complicated by the indemnity demands which are admittedly more than she can pay. Notwithstanding she is wealthy as national wealth is usually measured—that is to say, in farm lands and buildings, well-built cities, railroads, factories, etc.—it is wealth which is not available to pay foreign debts, except by the methods of the Middle Ages when the victor put the conquered population to the sword—men, women and children—and seized the country for their own.

The Germans do not admit that they were conquered in the first place; and in the second place, if they were conquered, they still have their wealth which under existing conditions is wealth only where it stands—that is to say, in their own hands. She cannot pay the indemnity as it now stands, therefore there has been no progress toward a solution of her fiscal problems. Germany, in short, is all dressed up and nowhere to go.

France is not an industrial nation in the sense that the word is used to describe Germany, England and the United States, and its economic problem is more nearly a state problem than in case of England or Germany; that is to say, if her government finances could be put in sound condition, her troubles would be largely over because she can support her population without a large export trade.

France is a great fertile plain with the finest peasant population in the world, but they don't like to pay taxes. Perhaps they think they paid enough taxes to support the brilliant people of the Court of Louis to last for two or three centuries. Be that as it may, they don't like to pay taxes, and the French statesman is reluctant to assess them.

The French also like their taxes in homeopathic doses, which accounts for the municipal tax frontiers.

Every large city has its custom office at city limits and imposes a small tax upon goods being brought into the city. For example, if you take a drive out of Paris, you must measure the gasoline in your tank and pay a duty if you come back with more gas than you went out with. The French hate taxes so badly that their system of assessment and collection is a very sketchy one.

Then, of course, France expects a

Business Economics Holds Europe in Pawn*

A Review of Conditions in the Principal European Countries Based on a Three Months' Trip Recently Completed—The Relation of the United States in the Economic Rehabilitation of These Countries Is Outlined

BY BRIGADIER-GENERAL GUY E. TRIPP

Chairman of the Board of Directors Westinghouse Electric & Manufacturing Company, New York, N. Y.

THE political leaders of Europe, the military and naval caste and the diplomats have had their day at juggling with the balance of power and now it is settling day, and furthermore, settlement with plodding economics cannot be made in their debased currency.

Of course, I have but little doubt that wars will be, in the future as they have been in the past, the European method of settling international differences; in fact, all indications point in that direction. The enmity between France and Germany is more deep-seated now than it has ever been and it casts an ominous shadow on the future, and the menacing situations all over southeastern Europe do not forecast a long period of peace.

However, one would think that all Europe is too sick to fight again soon.

It would seem necessary for her to inaugurate a reign of sound economics before she can get well, and we American business men are particularly interested in observing how she is progressing in this direction because her disease is contagious.

I have recently visited Germany and find a curious condition of affairs. To a casual observer the country is enjoying great prosperity. Factories are running to their capacity. Railroads and street railways are being improved. Building trades are brisk and there is

no unemployment. Workmen are more efficient than before the war and the output per man-hour is greater than the pre-war average.

I visited several of the largest manufacturing in Berlin and observed that they had plenty of raw materials, including copper. The wages paid were about one-sixth the rate paid in the United States. Their export business constitutes but a small portion of their business, home consumption being responsible for their activity, and demand was so great that many manufacturers were extending their works.

The impression which I received was that Germany is improving and building itself up as a national industrial machine which will be a formidable competitor in the world's markets when it is in the position to enter these markets.

But the reverse of that picture is the almost hopeless condition of her State finances.

The mark is worth less than $\frac{1}{2}$ cent in our money; in other words, German paper money is almost worthless. The people themselves don't like to take it. Let me give you an illustration. I was unable to secure rooms in any hotel in Berlin because the city was crowded with visitors on account of a race meeting and automobile show, and I went to a boarding house. When I left, the landlady asked me to pay her in American money, saying that, if I had none with me, she would prefer to wait and have me send it to her after I returned to New York. She

*Abstract of address presented at the annual dinner of the New England Street Railway Club, Boston, Mass., March 20, 1922.

large indemnity from Germany and I assure you that she intends to get all that Germany can pay; and I don't blame her for that. Until she is satisfied that the maximum is forthcoming she will continue to maintain a large army, consequently her expenditures will largely exceed her income.

France has not made any substantial progress toward balancing her budget, but her currency is not so hopelessly debased as that of Germany. If she could increase her taxes, or rather actually collect them, and reduce her expenditures in order that income should at least equal the outgo, then it might be possible to peg the franc at a stable value and stop its fluctuation, which is so deadly to business. That is to say, if she had a gold reserve which would permit of the redemption of the paper franc at 10 cents, for example, let specie payments be resumed at that figure. It would be a bitter pill to swallow and might require a scaling of her internal debt; or, in other words, partial repudiation; but it would result in a stable currency.

Italy has, in addition to her debased currency and her deficit, the problem of over-population in a country of which a very substantial portion is mountainous and cannot be cultivated, although even you New England farmers would be surprised to see what an Italian can do with a rocky mountainside.

A large emigration from Italy to South America may be one of the answers to over-population.

I have no figures, but my impression is that the clergy, military and naval officers, soldiers, police and holders of offices in government bureaus constituted quite a large proportion of the population. The financial burden of supporting these non-producers must be tremendous. Italy's currency fluctuates in value to the detriment of business, and she might also adopt the plan of stabilizing it by establishing a gold redemption value of the lira at less than its old parity, but the operation would be a more painful one than in the case of France because her currency is more debased.

It is characteristic of England that she should be the first to make real progress in setting her house in order. Her problems were and are very formidable, but every little while you see her really settling something and then turning her attention to something else. Her action regarding Egypt is the latest step. I was in Egypt in February of this year and found there a concerted cry of Egypt for the Egyptians.

One can understand the racial instinct to be free from domination of another race; but, when you see the great things the English have accomplished in that country and the relief that they have given to the native who was almost literally taxed to death under the rule of the Khedives, you wonder that

they would dare to reinstate the old régime. I couldn't discover that England had interfered with their social customs.

Great Britain met the situation through an arrangement under which the Egyptians form their own government and run their own political affairs, with a provision for British protection of her investments and the establishment of a kind of Monroe Doctrine. In spite of her Irish problem, her Egyptian problem, her Indian problem and her very perplexing home industrial problem, the exchange rate on the pound sterling is steadily rising and there is every reason to believe that it will soon be established on the pre-war parity of \$4.86. She is taxing incomes heavily, perhaps more heavily than any other nation in the world, and will probably balance her budget next year. It is truly a wonderful showing, and she is entitled to the respect and confidence of the world.

When the Versailles conference carved a lot of new little states out of Germany and Austria on the idealistic theory of self-determination of peoples, it at the same time set up an equal number of new trade barriers and the flow of commerce became more clogged at the very time when an easier flow than ever was demanded.

All these new countries established custom offices on their frontiers and in addition to all this the old countries inaugurated Chauvinistic policies and raised new tariff barriers to encourage home industries. If trade could be freed from these artificial restrictions to a large extent, it would greatly help the situation.

The European situation would be interesting to us if we were merely onlookers, but we are more than spectators. We are vitally interested both

as a creditor and as a commercial nation. At this moment there is no public sentiment here which would support the cancellation or reduction of the foreign debts which are owed to us, and I think public sentiment is right. It might be a wise policy for us to waive interest payments, but it seems to me that until Europe has worked out some definite plan for stopping her financial toboggan it would be idle for us to attempt to stop it by interposing a surrender of our claims only to have its benefits swept away by further deficits. If the time should come when a compromise of the amounts due us would clearly help a solvent and economical but overburdened people, then I should not expect the United States to insist on its pound of flesh. However, it is easy to generalize. The application of any remedy whatever is very difficult, and much must be left to the inexorable workings of economic laws; in fact, about all that can be done is to remove the obstacles in order that these laws may work freely.

In my opinion, the United States has nothing to be ashamed of; we went into the war with no thought of material gain. We did our best and did a great deal, and we came out of it with clean hands. We paid our own way and lent our wealth liberally, and we cannot now be justly criticised for waiting until Europe has shown its ability and intention to live within its income before we compromise our loans. I do not for a moment say that she is not doing all that she feels she can safely do to accomplish this end. But I do say that her large standing armies and navies and expensive government bureaus, even if they are necessary, are not the character of expenses which this country feels called upon to finance.

The Public You Serve Is Your Judge*

The Mass of the American Public Is Essentially Fair and Generous—
Its Judgment as to Satisfactorily Adequate Service
Cannot Long Be Wrong

BY E. MARK SULLIVAN
Corporation Counsel, Boston, Mass.

YOU have your difficulties, and they are with the great public which you serve. The motto, not only of you railway men but of every man dealing with the public, is "Service," and no service, however adequate, essentially adequate, can be satisfactorily adequate if the public fails to appreciate it.

You men have for years permitted yourselves to be regarded as persons engaged in the chief enterprise of robbing the public through the instrumentality of the cars and railways which you operate. You have failed adequately to take the public into your confidence. I have an abiding confidence in the great mass of the

common people. They have never been ultimately, nor for long time, wrong.

When the great Washington came here to New England to take control of the Continental troops the most he sought or hoped for was conciliation with the mother country on terms of honorable peace and conciliation. But public opinion ruled otherwise. When that vast territory we know as Louisiana was offered us for little or nothing by France the great Jefferson was opposed to accepting it, and only yielded because he listened to the voice of the great mass of the common people. Lincoln himself came to Washington as the newly elected President, hoping only that slavery might be restricted as to its territorial extent, and finally became the Great Emancipator only because he had a perfect sense

*Abstract of address at the New England Street Railway Club, Boston, Mass., March 23, 1922.

of the persistent demand of the common people of the country. Even that other man who in time became his successor—Woodrow Wilson—became great because he in the end listened to the voice of the common people.

BOSTON ELEVATED SUCCESS DUE TO GOOD PUBLIC RELATIONS

The American people are fair. They are by every instinct generous. I wish to pay my tribute tonight to Hon. James F. Jackson and his associates for the efforts which they are making to give to this great city a decent and adequate transportation system. And they are enjoying at the hands of the people of Boston today a sympathy and an intelligent tolerance that I believe few railway managers ever enjoyed in recent years. And the reason of it all is that no man goes to their office inquiring regarding the economics of that railway system without receiving prompt and generous explanation to every question of inquiry that is put to them.

The public are generous. They want to understand your problems. Why should they be retained within the inner offices of some dark chamber, as some dark mystery? The minute the railway employees say, "We want greater wages," the generous heart of the people says, "Give it to them," even though the fact still remains that the great mass of the people are themselves employed at wages which are perhaps extremely inadequate for a decent living, and the wage which you are paying these very men who seek for more is far in excess of what they are getting. That is born not of an economic understanding of your difficulties, but of a generous impulse of the heart. Come to them, you railway men of New England, come to them frankly; speak to them often; bring to your council boards men who are fairly representative of them, not of the railway employees, but of the great body of the public itself that you seek to serve. Speak to them frankly, not in those confusing tables of statistics that hardly anybody can read who has not helped to construct them within your counting rooms, but speak to them in simple terms, and you will find that they will give to your messages of frankness a generous response which will be encouraging to you, that will make your offices things of honor to yourselves and others instead of things of infamy as they are too often viewed by the great mass of the common people.

You are too often damned in case the public you serve are unreasonable, but it is because they do not understand. We ask for so much from our municipalities, and next to that from our public service corporations, not thinking that after all there is a countervailing proposition that must follow, until finally we find the whole economic system oppressive. After all, all these things come out of the

loins of the common people. They are not quick to understand it. Indeed, most of these economic problems are so involved that oftentimes even you don't see clearly the proposition that lies immediately before you. Then how can they? But, be generous with the great mass of the common people. They have always been right in the

history of this country. They have instinct for right. They have a natural impulse for generosity. They would deal generously with you. I feel that after all there is applicable to your situation with relation to the public what was said and is often said by the French people: "To know all is to understand all."

Possibilities of Developing Chicago's Transportation Facilities*

Chicago Needs Some Subway Facilities Now and a Comprehensive System
Ultimately—Tremendous Immediate Betterments Possible in Existing
Surface and Elevated Lines Prevented by Condemnatory Municipal
Sentiment—Buses Rapidly Becoming a Factor

By HARRY L. BROWN

Western Editor ELECTRIC RAILWAY JOURNAL and BUS TRANSPORTATION

THE whole aspect of the transportation system in Chicago could be changed almost over night if the present destructive, insincere, condemnatory sentiment toward the traction companies as fostered by the municipal authorities were to be replaced with a spirit of co-operation and fair dealing. The inadequacies of the present facilities may be almost wholly attributed to the inability of the companies to finance improvements, and this inability is altogether a result of the belligerent attitude just mentioned. The real marvel is that so much service is given and that so much progress has been made by the present companies with the limited facilities at their command and under the conditions prevailing.

The efforts of the city hall have been concentrated on an endeavor to get a 5-cent fare, despite the fact that the courts have repeatedly held this to be impossible. As to the subway project, sufficient money has already been paid into the city's traction fund by the street car riders to pay the entire cost of a stretch of subway extending from Chicago Avenue to Sixteenth Street. This, if placed at the disposal of the present elevated railways, subject to proper rental charges, would make possible an improvement in service of most important consequence to every section of the city now served by the "L" lines.

One of the greatest handicaps to any increase and speeding up of elevated service is the fact that the usable capacity of thirteen tracks is limited to the capacity of but two tracks through the loop. The subway suggested is the initial step proposed by the Traction and Subway Commission in its very able plan for a comprehensive subway, elevated and surface lines system. This initial piece of subway would open the way for a tremendous improvement in "L" service, provided again that the fundamental credit of the companies were restored through proper attitude on the part of the municipal authorities and the people generally, so that the additional equipment needed could be financed.

If this initial step in the subway plan were completed, it would so relieve the situation that the further subway construction could follow along in a normal program as needed without burdening the city beyond its financing capacity or beyond an amount that could be carried by the resultant earnings. There has been much discussion as to the best location for the north and south bore of the initial subway through the central business district. The Traction and Subway Commission recommended that it be placed under State Street. With the recent very wonderful development of the Upper Michigan Avenue district, there has been much agitation for putting the initial bore under Michigan Avenue. My own opinion is that it might better be put under Wells Street in order that it may be nearer to the future east and west center of the loop district.

The first stretch of subway north and south through the loop district connected up with the elevated system would make it possible to relieve the elevated loop of all of the north and south trains, thus making the entire capacity of the loop available for the west side elevated trains. This would increase the capacity of the whole elevated system substantially, and afford an improvement in service that would be very notable.

The next logical step in subway development would be a pair of east and west subways for the use of service cars. This would gradually relieve the vehicular congestion in the loop district and make it possible to cut probably fifteen minutes from the running time of the west side surface cars.

Chicago is in need of some subway facilities now, and a comprehensive subway system ultimately. But there are tremendous possibilities of improving present traction facilities if, without any subway construction at all, the present companies were in a position to finance betterments. There are a number of improvements of very far reaching effect in the minds of the local traction officials which would be carried into execution if they could be backed up with the assurance that the further investment in the properties would not

*Abstract of paper presented at Midwinter Convocation of Engineers, Chicago, March 22, 1922.

jeopardized in the manner in which the present investment has been. At the same time the service now being rendered and the general property of the companies is excelled in few if any other cities. Our local companies are equipped with the brains and the will to give Chicago the greatest transportation service known to the art, if given a fair opportunity.

In a general consideration of the transportation facilities of Chicago, there is a new kind of transportation that has reached such a point of development that it merits very serious consideration. I refer to the use of motor buses. Chicago already has the Chicago Motor Bus Company operating on the north side, which is now carrying nearly ten million passengers per year and operating sixty buses 150,000 miles a year. This is only a beginning, for the operations of the company are limited to the north side, though plans are formulated for extending the service to the boulevards of the south side and possibly the west side. The Depot Motor Bus Lines, Inc., is operating a special service for commuters and shoppers between the Union and Northwestern stations and the State Street shopping district. This company carried approximately 600,000 passengers during the year 1921 with a fleet of eleven buses. Several bus lines are operating from terminals on the elevated lines out into the neighboring territory beyond. The Edgewater Beach Hotel is operating a regularly scheduled bus service for the use primarily of its own guests.

There are a number of other routes in the city over which buses could be operated to provide a service that would be much appreciated. There is also the possibility in the comparatively near future of the establishment of what may be called rapid transit motor bus service. This would consist, for example, of a de luxe non-stop, high-speed bus service between the loop and such thickly populated centers as the Wilson Avenue district, the Sixty-third Street district, or some of the west side centers. A necessarily high rate of fare would be charged and it would attract, in the main, people accustomed to driving their own automobiles and hence willing to pay for a service comparable in speed and comfort with that of their own car, though cheaper, and relieving them of the downtown parking nuisance. Such a service could not be said to compete particularly with existing railway lines for it would create largely its own traffic.

Similarly, the bus lines already in operation may not be considered to be really in competition with the railway systems of transportation. Strictly speaking, they may haul some people who would otherwise use the street cars or elevated lines, but in large proportion their patronage comes from a newly created traffic which did not exist in this section before the bus service was inaugurated.

As long as all such bus lines are operated so as to be supplementary or

complementary to previously existing transportation lines, they should likewise be given every encouragement. The development is economically sound, as it increases the means of communication, but any substantial duplication of service is dangerous not only to the older transportation agency but to the new one as well. Chicago has had one example of the effect of duplication of service in the Oak Park "L" and the lesson should not be lost.

This leads up to the great desirability, from the standpoint of the people, of having all of the transportation facilities of any one community under the control of one transportation organization. That is the practice in many European cities. Unified operation of all the elevated, surface and subway rail systems and surface bus lines assures the use of each in the field for which it

is particularly suited and results in the most complete service at the lowest cost. It brings about a co-ordination of facilities and an efficiency in their use which cannot be gained through independent operations. Hence without attempting to go into detail, an enlightened settlement of Chicago's transportation problem would dictate that an early consideration of all transportation facilities should be effected. This, of course, means the working out of a contract between the city and the transportation companies which will insure good service at the lowest cost to the people of Chicago and the opportunity to the company to earn a return on the investment which will continuously attract to the business the large sums of money needed to extend its facilities in keeping pace with the growth of the city.

Key Route Discussed by W. R. Alberger

At Meeting of Pacific Traffic Association Vice-President of San Francisco-Oakland Terminal Railways Tells of the Goat Island Terminal Project and Gives Operating Data of Railway System

W. R. ALBERGER, vice-president and general manager San Francisco-Oakland Terminal Railways, read a paper entitled "The Goat Island Terminal Project" at the meeting of the Pacific Traffic Association held in San Francisco on March 7, 1922. This title does not indicate the scope of the entire paper, because after telling all that he could about the project of his company to extend its lines to Goat Island in San Francisco Bay, Mr. Alberger

Goat Island; thence through a tunnel or by a track skirting the island around to the northwestern side, at which point it was proposed to build a ferry terminus.

In 1900 when the Key System was first projected, its promoters had in mind the development of Goat Island as a terminal, but the earthquake and fire of 1906 threw such an unexpected burden of traffic upon the Key System and its affiliated street car lines that the plan of making the island a



SAN FRANCISCO AND SURROUNDINGS. DRAWN TO SHOW RELATION TO GOAT ISLAND TO EXISTING TRANSPORTATION FACILITIES

gave his hearers a great deal of general information regarding electric railway operation and the operation of the "Key System" in particular.

First as to the Goat Island proposition, he traced the history of the island and said that it has long been looked upon by railroad engineers as a proper terminal point for transcontinental railroads. As late as September, 1920, Admiral Joseph F. Jayne, commandant of the Twelfth Naval District, outlined a plan for a terminus at Goat Island by the extension of a trestle or pile bridge from the Key System Mole to the eastern side of

terminus was abandoned. On Feb. 9, 1922, however, the San Francisco-Oakland Terminal Railways filed with the Secretaries of War, the Navy and Commerce an application for permission to do certain things toward creating a terminal. It also requested the government to establish bulkhead and pier-head lines. If a favorable decision is received the company will proceed along the following lines:

1. Extend the present solid fill as far as the government will permit.
2. Build from the end of that fill to the vicinity of the northeast corner of Goat Island a trestle or bridge, or

trestle and bridge, and upon the extensive shoal lying north of the island create a terminal by surrounding a portion of the shoal to be used with a loose rock wall and then, by dredging the sand from the bottom of the bay to the inclosed space within the rock wall, create the terminal site.

The procedure outlined is similar to the method adopted in the construction of the solid fill a few years ago. The large ferry terminal would then be established near the northwest corner of the island. The plan is to create a union terminal that can be used by the company's lines or any other lines, electric or steam, and also by automobiles.

OPERATING FACTS REGARDING THE TERMINAL RAILWAYS

Leaving the subject of Goat Island, Mr. Alberger took up the more general one of street railway problems, illustrating them from the experience of his company. For example, in the matter of taxes those of the company increased in 1921 over 1920 nearly \$50,000 or almost 15 per cent. He pointed out also that a street car company is obligated to furnish ample transportation facilities on its different lines, a sufficient number of cars at proper headway to accommodate the traffic. His company operates every car upon a definite time schedule. A careful check of car operation during twenty-four hours indicated that 92 per cent of all the cars pass a given central point exactly on time.

In 1921 the company carried 111,759,675 passengers with only one fatality, and that not caused by the negligence of the company or its employees. During the year the cars made 16,887,649 revenue-miles, which is equivalent to one car making 2,612 round trips by the shortest route between Oakland and New York, or an average of more than seven such round trips daily. The company had a total of 3,554 accidents, an increase of ninety-three over the previous year. Of these, 2,480 were beyond the control of the company or its employees, and of the 2,480 accidents 2,224 were occasioned by automobiles running into the cars. The accidents over which the employees had control decreased 174 during the year.

Again, electric cars require more inspection and cost more for upkeep than the steam railway cars. They each make hundreds of stops per day, many requiring emergency brake applications and reversals of electric power. On this property in 1921 the cars averaged 181 miles per day. They were inspected a total of 256,798 times and thoroughly cleaned 186,385 times. More than 600,000 windows were cleaned.

OPERATION OF KEY SYSTEM EXPENSIVE

The operation of the Key Division of the property, including ferry boats and connecting trains, is very expensive. On this system the rates of fare, he explained, are the lowest, both single trip and commutation, for the kind of service furnished, in the entire world. The

average rate per mile, one way fare, for the longest haul of 13 miles, is 1.38 cents. For the average haul it is 2 cents per mile. The average rate per mile for monthly commutation tickets, costing \$4.80 for the longest haul, is 0.6 cent, and for the average haul 0.87 cent. The trans-bay rates, both one way and commutation, are not, and never have been, remunerative.

The commissary department of the Key Division during 1921 earned nearly \$122,000 net from the operation of its restaurant, news stand and bootshining stand. This was 23 per cent of the entire net income of the division. In other words, notwithstanding the facts that in 1921 nearly 16,000,000 people were carried, that the boats made 39,388 trips, or 113,024 boat-miles, and that 314,560 trains made 3,188,129 car-miles to and from seven different east bay localities, nearly one-quarter of the entire net income of the division came from selling food, gum and periodicals and from shining shoes. The remaining three-quarters came from transporting millions of people according to their desires with the large amount of transportation facilities which were furnished as described.

Convention of Southwestern Association

THE latest bulletin of the convention committee gives information, supplementary to the appearing in the issue of this for March 4, regarding the first convention of the Southwestern Electrical & Gas Association and the Southwestern Geographic Division, N.E. This will be held at the St. Anthony Hotel, San Antonio, Tex., May 3 to 6 inclusive. Those planning to attend are urged to make hotel reservations promptly through the convention committee, S. J. Ballinger, San Antonio Public Service Company, chairman. The committee has arranged for special rates at the St. Anthony, Menger, Gunter Hotels and can obtain rates at Travelers, Lanier, Crockett, Hute and other first-class hotels.

The convention will open on Wednesday morning, May 3, at 9.30 o'clock with a general session in the ballroom of the St. Anthony Hotel, and general sessions will be held each morning during the convention in the same room. The afternoons will be devoted to departmental sessions.

American Association News

Membership Placard Sent Out

THE committee on company and associate membership has distributed, throughout the association, copies of an attractive membership card in colors for display in offices. The committee suggests that the card be framed and hung in the offices of member company executives and especially in those of purchasing agents, where it is hoped that it will be a reminder of the advantages of the membership. A reproduction of the card in one color was given in the issue of the ELECTRIC RAILWAY JOURNAL for March 4, page 353.

Rousing Dinner Meeting of the Connecticut Company Section

RAILWAY men from all parts of Connecticut flocked to New Haven on March 21 to attend the first dinner meeting of the Connecticut Company section for the current year. The Connecticut Company orchestra made its first appearance at the dinner, which was served at the Hotel Garde and attended by 176 members and guests.

S. W. Baldwin, of the legal department, presided in the absence of President Chapman. W. J. Flickinger, assistant to the president, opened the program with a report of the Midyear Meeting of the American Association. J. K. Punderford, vice-president and general manager, supplemented the story of the Indianapolis meeting, and explained the local fare situation in

the towns of Norwalk and Bridgeport.

The plan was to call for reports from the division managers, but there was time for reports from only W. J. Kingdon, Stamford division, who told of his experience with motor operation, and J. B. Potter, Bridgeport division, who told of the situation in his territory. The members present were pleased with this plan of having reports from the divisions.

The next speaker was H. H. Norwalk, of the ELECTRIC RAILWAY JOURNAL, who spoke of the permanency of the electric railway industry, and pointed out the place of the motor bus in relation to electric railway service. President L. S. Storrs, the principal speaker of the evening, then gave a frank and interesting talk regarding buses and their relation to regular trolley service. He also traced the history of the jitney from the time of its inception on the Pacific Coast. Mr. Storrs quoted statistics of operation of the Connecticut Company and encouraged his associates by his statement that conditions on the property are improving.

Big Growth for Camden Section

AT THE last meeting of the Public Service Railway company section of the Camden Division, the election of new members was announced. The meeting was of a social nature, with boxing bouts, clog dancing, singing and orchestral music. There was also an exhibition of feats of strength by the "strong man" of the section.

Recent Happenings in Great Britain

South Eastern Railway Electrification—Statement of What May Be Expected Along These Lines in Future

(From Our Regular Correspondent)

ANNOUNCEMENT was made by the chairman, Cosmo Bonsor, to the joint meeting of the South Eastern and the London, Chatham & Dover Railway companies, regarding the long-projected scheme for the conversion to electric traction of the suburban lines of the two associated companies. He referred to the destruction of the companies' short-distance metropolitan traffic by tramway and omnibus competition, and said that the revenue obtained outside the metropolitan area was threatened by the extension of road competition.

Ambitious Electrification Project Postponed

Before the war the directors were preparing plans for the electrification of the companies' system within a radius of 20 miles of London. The war postponed the scheme, and at the end of the war government control had so diminished railway credit that it was impossible to raise the capital. The Trade Facilities Act was passed last autumn, and the directors immediately took the opportunity that it gave of asking for a government guarantee as to principal interest of new capital. They were able to show the government that with seven London central passenger stations they had a splendid position for distributing passengers and would be able to increase development in Surrey and Kent. The proposals met with favorable consideration, and the explanation that it was impossible to ask the shareholders in present circumstances to consent to a direct obligation by the issue of capital was also accepted by the government committee on the subject. It would be necessary to form a construction company. Its capital would be small, and it would not trade for profit. It would have borrowing powers sufficient to cover the cost of construction. The money borrowed would carry the government guarantee both as to principal and interest, and would be obtained on the most favorable terms.

Long-Term Leasing Arrangement Proposed

The works would be the property of the construction company and when complete would be let to the two associated railways on lease for twenty-five years at a rent sufficient to repay the capital at interest at the expiration of the lease, when the works would become the property of the two companies. The opportunity was unique, the arrangement good, and the figures as to results were estimated to be extraordinary. Giving a very moderate increase in the number of passengers, along with an ascertained decrease in working expenses, the directors estimated that in the second year of working not only

would the rent be earned but there would be a good margin of profit which would increase as years went on.

On Mr. Bonsor's announcement it may be remarked that the arrangement which he outlined is a peculiar one so far as any rate as British railways are concerned. I believe that at present the South Eastern and Chatham Companies do not possess Parliamentary powers to use electric traction, and that the plan outlined by Mr. Bonsor will enable the work to be put in hand without the delay of getting Parliamentary powers. The Ministry of Transport has power to issue orders to facilitate railway development, and evidently these are sufficient to meet the present case. The Ministry, I understand, made an order some time ago. The difficulty of raising capital will be overcome by the government guarantee. Probably it is on account of these special arrangements that the difficulty encountered by the London, Brighton & South Coast Railway in raising loan capital (as explained below) has not emerged.

Electrification to Continue as Circumstances Permit

The chairman of the London-Brighton & South Coast Railway, C. Macrae, made it quite clear at the annual meeting of the company that while the electrification of the London suburban lines would be continued as circumstances permit, the conversion of the main line to Brighton is still a matter for the future. He said that the extension of the electrical system to the railway from Balham Junction to West Croydon, which passed through a congested area, was nearing completion, and it was hoped that this section would be open for electric traction by Sept. 1 next. This section, however, formed only a small part of the whole scheme which had been prepared by the company's consulting electrical engineer, Sir Philip Dawson. The full scheme had been submitted to the Ministry of Transport, and it included the electrification of the whole of the suburban area as well as the equipment of the main lines to Brighton and Lewes, with which in course of time it was hoped to proceed. The outlay of capital would be very considerable, and as the present time was not opportune for raising money the directors had determined that until the times improved extension of electrification should be confined to those sections of the suburban system where the needs were greatest. The grouping and amalgamation of companies, as provided by the Railways Act, 1921, was having a paralyzing effect on schemes of electrification. The London & Brighton Company was to be amalgamated with the South Eastern & Chat-

ham and the London & South Western Companies. Each of these companies had a different system of electrification, so that there was a bar on the London & Brighton Company going ahead with its own program. The Ministry of Transport had, however, appointed a committee to report on the steps advisable for the companies concerned to take on the electrification schemes they had in contemplation. In regard to capital for developments, the directors had thought that there might be a possibility of obtaining powers from Parliament to raise money by borrowing without being put under the obligation that the exercise of borrowing powers should be contingent on a previous issue of three times the amount of share capital. Application was made for a Parliamentary bill for the purpose, but objections were raised by debenture and preference stockholders and others. In the meantime the appointment of the Ministry of Transport committee above referred to was made, and as the main reason for the promotion of the bill was to obtain capital for electrification work, the advisability of waiting for the report of the committee became obvious. The directors had accordingly deemed it wise to withdraw their bill from Parliament.

R. H. Wilkinson, general manager of Bradford Corporation Tramways, in the course of an inquiry regarding an application by his municipality for further borrowing powers, made the remarkable statement that owing to the increased cost of tramway track construction 75 per cent of the town Council's lines would eventually have to be abandoned unless some form of transport cheaper than the tramcar was adopted.

Surface Lines Spurred to Advertise

The London County Council, spurred on no doubt by the intense competition of motor buses, continues to advertise its tramway undertaking vigorously. A recent poster informs the public that the total cost of the system has been £14,500,000, and that the capital repaid out of revenue to date amounts to £6,000,000. The sum paid last year for interest on and redemption of capital was £600,000. It is proudly added that when the balance of capital indebtedness has been paid off Londoners will own the finest tramway in the world, and debt charges will be nil.

The first year's working of all-night tramcar services in Glasgow has resulted in a loss of £1,098.

At the British Industries Fair, held in London early in March, an exhibition of some of the artistic designs for London underground railway posters received much attention from foreign buyers who visited the Fair.

In the House of Commons on March 13 it was officially announced that the Treasury had agreed to guarantee a loan to be raised by the London underground railway companies for the extension and improvement of its tube railway system. This means that the long-contemplated developments are likely to be put in hand soon.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Paving Requirement Modified

Commission Unwilling to Pass Added Burden of New Paving on to Car Riders

In spite of a contract calling for repairing of Yale Avenue, Swarthmore, Pa., the Philadelphia (Pa.) Rapid Transit Company has been freed from all obligations except those included in repairing its own tracks and paving between them and for 18 in. on either side. This decision, handed down by the Public Service Commission on Aug. 16, 1921, and just published, is based on the principle that the ordinance provisions were unjust and unreasonable, would result in increased expenses to the company that would devolve upon the public and that anything which stands in the way of securing reasonable and adequate service or imposes upon the public an unnecessary burden of increased rates opposes the public policy of the State.

The borough of Swarthmore, in submitting the case to the Public Service Commission, protested that the municipal ordinances should be the factor used by the Public Service Commission in determining the duties of the railroad company. The company admitted the jurisdiction of the commission, as did the city, but contended that its duties must be determined by the commission upon the facts disclosed by the evidence by applying the commission's principle of what is a just and reasonable standard.

The report of the commission reviews the history of the case and shows that the Philadelphia, Morton & Swarthmore Street Railway and the borough of Swarthmore made a contract in September, 1900, whereby the traction company was given permission to operate on the streets of the borough, and in return agreed to reconstruct the paving on Yale Avenue from curb to curb. Under the type of paving adopted originally and with the wear and tear to which the roadway was then subjected the cost to the railway of meeting its paving obligation was about \$490 a year for the entire area involved. Since then, however, the situation had changed and the type of paving originally installed had become entirely inadequate. When the time came to pave with new and more expensive material it was sought to shift the added burden to the railway.

The commission pointed out that the railway offered evidence, which was not contradicted, to show that its total annual revenues from the Borough of Swarthmore in 1919 were \$10,080 and its yearly operating expenses in con-

ducting that service \$9,070. It is obvious, therefore, according to the commission that if the complainant's contention was sustained and the ordinance provisions made enforceable, either in the courts or before the commission, one of three eventualities would occur:

(a) The company would be so shorn of revenues that the public, including the Borough of Swarthmore, would ultimately be deprived of all street car service.

(b) The rate of fare imposed upon the Swarthmore patrons would be increased so high as to be practically prohibitive.

(c) The financial burden of maintaining the Swarthmore service would have to be passed on to and be borne by other car riders of the Philadelphia Rapid Transit Company in Philadelphia and elsewhere, who are not immediately concerned in the Swarthmore service.

In consequence of the condition of affairs thus recited the commission ruled as follows:

Any or all of these contingencies are violative of the basis upon which proper public utility regulation rests. The utilities no longer function as private enterprises. They have public duties to perform. They are required to render adequate service at reasonable rates, and the rates must produce the revenue to maintain that service. To require the car riders to pay what would appear to be exorbitant rates, or to accept the alternative of being obliged to forego the benefits of all service because the operating company's revenues are required to be diverted in order to meet such ordinance obligations, is as unwise a public policy as it is bound to be destructive of the service which the public require and which such carriers are expected to render.

In short, the commission, after reviewing briefly the intent of the legislation creating that body, said that "it would be a waste of argument to attempt to establish the obvious, namely, that the commission is called upon to exercise the police power of the State when rates are involved, but cannot do so where service, facilities and practices, affecting intimately the same public, are involved."

Wage Agreement Reported

Railway employees of the Dominion Power & Transmission Company, Hamilton, Ont., are reported to have reached an agreement on wages as a result of the efforts of a board of conciliation which was appointed under Federal labor laws to arbitrate the dispute. The proceedings of the conciliation board were interrupted while the parties were brought together. The definite results were not announced, but it was stated that a basis of agreement had been arrived at and that when the contract is drafted it will receive the ratification of the board of conciliation without further litigation.

New York Hearings Postponed

Frank Hedley, president of the Interborough Rapid Transit Company, New York, N. Y., said on March 24 at the hearing of the Transit Commission that he would advance his program for the purchase of 350 cars now contemplate during the next five years if the Interborough could get from the Manhattan Railway, which owns the elevated railway system, a reduction in the present rent for the elevated lines.

Mr. Hedley said that if the city would provide the necessary storage yards and shop facilities, and if there were no difficulties about power, it would be possible to begin to put the cars into service in about seven months after a start was made. The purchase of additional cars would permit the Interborough to extend its period of maximum operation so as to spread the rush-hour traffic over a longer time.

Ex-Justice Clarence J. Shearn, special counsel of the commission, said Mr. Hedley would be questioned concerning the possibility of improving the service in non-rush hours at a subsequent hearing.

Upon the representation of James I. Quackenbush, general counsel of the Interborough, that the crucial period in the negotiations of that company with the Manhattan Railway for a reduction of rent would occur during the week ended April 1, the commission adjourned its inquiry into Interborough service until the afternoon of March 30 and agreed to postpone the Interborough valuation hearing, scheduled for March 29, for a week. Mr. Quackenbush said that Dwight W. Morrow of J. P. Morgan & Company, representative of the 5 per cent bondholders, was expected to return on March 27.

Engineering Congress Should Be Internationally Promoted

A very pronounced feeling exists in engineering circles in Washington, D. C., that the proposed Engineering Congress to be held in connection with the Philadelphia Sesquicentennial should be promoted in a national and international way, and that this can best be done by the Federated American Engineering Societies. Local promotion of the congress would be handicapped, it is believed, by the assumption that Philadelphia engineers naturally would be inclined, by the incidental benefits to their city, to represent such a gathering as certain to be a momentous occasion. If the arrangements were handled by the national machinery which the organizations in many branches of engineering have set up it is believed a distinctly different impression will be created.

Another Subway Plan for Chicago

Committee of Local Engineers Prepares Plan for Local Transportation Committee, Giving Locations and General Designs for Initial System in the Central Business District

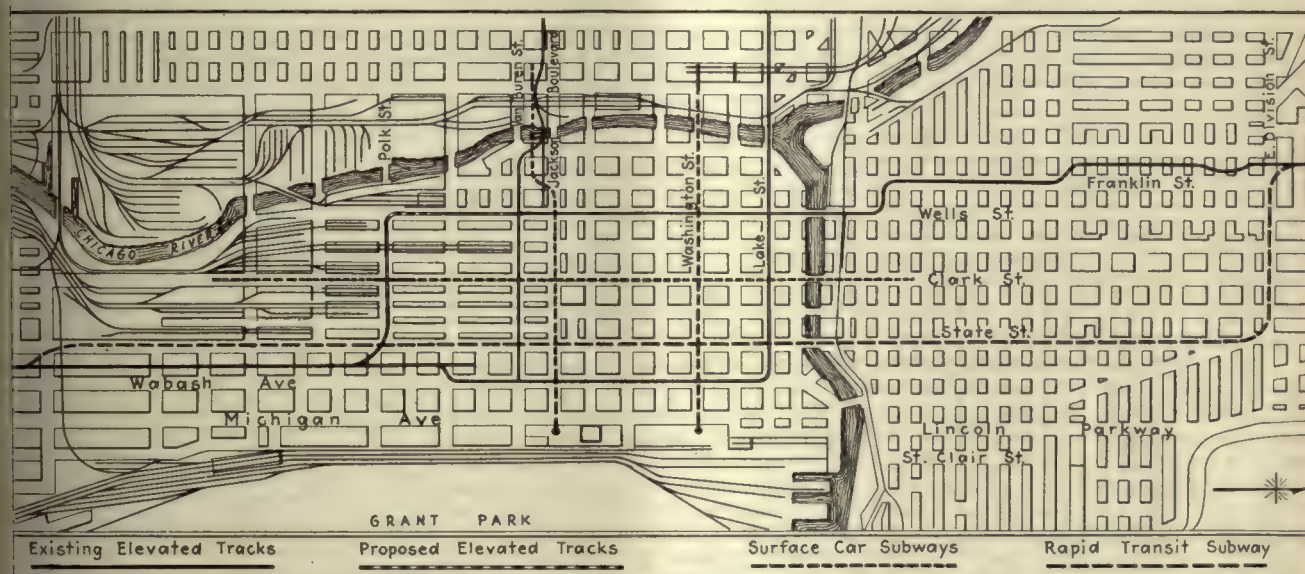
A COMMITTEE of five Chicago engineers comprising Bion J. Arnold, chairman of the Board of Supervising Engineers, Chicago Traction; R. F. Polker, Jr., city supervisor of transportation; Harold Almert, representing the American Society of Engineers; Charles E. Fox, Illinois Society of Architects, and Joseph H. Prior, Western Society of Engineers, appointed by the transportation committee, Chicago City Council, made its report to the transportation committee on March 27, presenting locations and general designs for an initial subway system.

present Washington Street tunnel under the river, which is so constructed that connection could be made to it at either end without changing the permanent structure. The subway under Jackson Boulevard would connect with the tunnel under the river at Van Buren Street. Through these two east and west subways, about 80 per cent of the surface line cars that now serve the northwest and southwest portions of the west side could be operated. The Clark Street subway would serve to handle approximately 45 per cent of the surface cars now operating through

ways would be located between State Street and Michigan Boulevard in both of the east and west tunnels. There would also be two transfer stations, each two blocks long, in the Clark Street subway, one at Jackson Boulevard and one at Washington Street, and each having an extension westward from Clark Street to Wells Street. There would be a through station on Clark Street at Harrison Street.

RAPID TRANSIT SUBWAY

The rapid transit subway would be constructed as a two-track low-level subway in State Street, so arranged that it can later be made a four-track subway. Owing to the limitations imposed by the location of the Illinois tunnel, the construction of this subway would necessarily involve taking care



MAP SHOWING ROUTE OF SURFACE CARS AND RAPID TRANSIT SUBWAY LINES PROPOSED BY ENGINEERS TO CHICAGO COUNCIL COMMITTEE

This committee of engineers has served without pay as the result of a resolution passed by the transportation committee of the City Council on Feb. 21, 1922, requesting recommendations for its guidance.

The engineer committee recommended the immediate construction of two east and west and one north and south low-level subways for the use of surface cars, and one high-level north and south subway for rapid transit purposes. The surface car subways are planned for Washington Street and Jackson Boulevard, extending from Grant Park on the east to Clinton Street on the west; and under Clark Street, extending from Thirteenth Street on the south to Grand Avenue on the north. The subway for rapid transit purposes would be located under State Street and extend from a junction of the South Side Elevated Railroad at Eighteenth Street to Division Street on the north, thence west in Division Street to a junction with the Northwestern Elevated Railroad near Franklin Street.

The Washington Street surface car subway would be connected with the

the business district and serving the north and south parts of the city. It could take care of practically all of the through-routed cars, while the morning and evening rush-hour trippers could be operated on loops now in place on the surface. These three surface-line subways would all be built with two tracks.

The engineers estimate that the Washington Street subway could be constructed as a tunnel and not seriously disturb the present utilities in the street, at a cost of approximately \$4,500,000. The subway in Jackson Boulevard could be similarly constructed at a cost of about \$4,900,000. Owing to the limited space between the top of the Illinois Tunnel Company's structure and the surface of the street, the construction of a subway in Clark Street would necessitate taking care of the utilities now in the street by means of suitable utility galleries. For this reason the engineers estimate the cost of this subway, including the cost of taking care of the utilities and the new tunnel under the river, at about \$9,000,000.

Stations for these surface-car sub-

of the property of the utility companies now in the street. The engineers state that this can best be accomplished by locating the two tracks first constructed on one side of the street, preferably the west side, permitting the construction of the complete unit on the west side of the street including the utility gallery, and thus not preventing the building of the east tracks, with their utility galleries, when needed for a comprehensive subway system.

Stations of sufficient length to accommodate ten-car trains would be located at Twelfth Street, Harrison Street, Jackson Boulevard, Washington Street, Chicago Avenue and at Division and Clark Streets. The estimated cost of this subway is \$16,000,000.

If the State Street subway is constructed as described, the engineer committee states that it could be best utilized in conjunction with the present elevated system, but that this would involve the construction of an extension of the elevated system in Wells Street from Van Buren Street to Polk Street, and then east to a connection with the main line of the South Side Elevated Railroad. This would involve an ex-

penditure of about \$1,200,000, which should be furnished by the elevated railroad companies. Arrangements should be made at the same time for the elimination of the grade crossings on the elevated lines at Van Buren and Wells Street. This extension and grade separation, if built and operated in conjunction with the State Street subway, will double the track capacity of the elevated lines serving the West Side.

The subway system as just described is so planned as to form the nucleus of and connect up with any one of the three comprehensive plans previously submitted to the local transportation committee, namely, the Arnold plan of 1911, the Harbor and Subway Commission Plan of 1913 and the Chicago Traction and Subway Commission plan of 1916. All of these systems provide for either the unification of existing transportation systems or the independent operation by the city of a comprehensive rapid transit subway.

A summary of the total cost of the initial subway scheme as recommended by the committee of engineers follows:

Washington Street Subway....	\$4,500,000
Jackson Boulevard Subway....	4,900,000
Clark Street Subway.....	9,000,000

Total cost street car subways..	\$18,400,000
Rapid Transit Subway, State Street	16,000,000

Total estimated cost all subways	\$34,400,000
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These estimates are all for structures only, ready for the installation of tracks and equipment.

It is interesting to note that the amount of money in the city traction fund, as paid from the proceeds of surface lines operation, is now approximately equal to the total cost of these initial subways recommended by this committee of engineers.

SUPPLEMENTAL REPORT SUGGESTS ANOTHER SUBWAY

In addition to the matter appearing in the report of the committee of engineers as abstracted above, a supplemental report was also presented to the local transportation committee March 27, in which reference was made to the rapid growth of the district lying east of State Street and between the Chicago River and Lincoln Park. There has been much agitation for a subway to serve this district. With regard to this, the supplemental report states that special transportation, in the form of a subway for this district, while desirable from a municipal point of view and attractive from the standpoint of ease and low cost of construction, cannot, in common with the initial subways recommended, now be justified on the basis of earnings on the capital investment required.

Should the present development continue, however, even for a short period of time, transportation for the district should be provided, and probably by means of a subway connecting the outlying districts north and south and passing along the east margin of the city and following the suggestion con-

tained in the Traction and Subway Commission's report of 1916. This subway would extent from a portal at about Eighteenth Street and Indiana Avenue, on the south, following Indiana Avenue, to Twelfth Street, thence north in the parkway east of Michigan Avenue, under the river to St. Clair Street, and thence swinging into North Michigan Avenue, at Chicago Avenue, up the parkway east of Lake Shore Drive and under Lincoln Park, with a portal located at North Avenue. This subway would connect with the Grant Park ends of the west side subways opposite Jackson Boulevard and Washington Street, thereby providing facilities for looping or rerouting cars from all parts of the city.

Columbia Increases Service

More Cars Being Run Under Police Protection—Arbitration Refused by South Carolina Company

There has been no recurrence of violence by strikers on the lines of the Columbia Railway, Gas & Electric Company since the early part of last week. The police continue to guard each car by a detail which follows in an automobile, but the number of policemen in each automobile has now been reduced from four or five to two. By March 28 twelve cars had been put in service, beginning operations at 7 a.m. and running to 7 p.m.

Efforts by the union to get somebody to arbitrate the trouble so far have been unsuccessful. Among those suggested have been the industrial relations committee of the Chamber of Commerce and an arbitration board to be appointed under the Gerald Arbitration Act, but the company has refused to submit what it conceives as its "business affairs" to arbitration, and if an effort is made to enforce the Gerald Act the company has declared that it will test its constitutionality. In a statement issued March 25 R. Beverley Herbert, attorney for the company, said in part:

We wish to call the attention of the public to the fact that there was no dispute with the union or our former employees about wages or the hours of work. The union accepted the wage scale and hours we offered. The dispute was as to whether or not we would submit to arbitration the question of discharging an employee whose services were not satisfactory to the company. We think any one who will consider the matter will understand that we could not employ men and let them or any one else other than the company decide whether their services were satisfactory and whether we would continue to employ them.

We have nothing against the former employees and are not opposed to unions or union labor. On the other hand, we have genuine sympathy for labor and for our former employees. When they went on a strike we put the cars in the barn and let them stay there a month, hoping that the men would come back to work and we then gave them every opportunity to come back to our employment before we employed other men. We tried to make them understand our position and to see that we were in earnest. We think they have failed to understand that either we will have to operate the street railway as a business concern or cease to run the cars at all. With us it is not a question of going back to the old contract. It is a question of running the street railway company without arbitration or going out of the street railway business.

Improvements Planned for Rochester Lines

An inclusive program of track reconstruction and service improvements for 1922 for the Rochester lines of the New York State Railways was recently outlined by Charles R. Barnes, commissioner of railways. The contemplated improvements will cost about \$500,000. The plan provides for the installation of cross-town service in the northern part of the city, tapping the Clifford, Portland, Hudson, Joseph, Clinton Avenue; St. Paul, Lake Avenue, Dewey Avenue and Driving Park Avenue lines. The Dewey Avenue service will be extended from Ridge Road to Stone Road. Trackless trolley cars will be used on both the cross-town lines and the Dewey Avenue extension. The Clinton Avenue north line will be extended from the present terminus to Keeler Street, a distance of 1,750 ft.

Service will be extended on the Lyell Avenue line by utilizing the tracks of the Rochester, Lockport & Buffalo Railway. Owl-car service will be furnished soon on the Park and Dewey line.

Mr. Barnes' statement says that consideration is being given to the extension of service in Chili Avenue and Culver Road sections of the city by the installation of trackless trolleys.

A terminal building and loading platform will be erected at Ontario Beach Park in time for the summer travel.

In his statement itemizing the improvements Mr. Barnes says that extensions of service in the past have not kept pace with the growth in population and area of the city. He also said that it was the consensus of opinion among street railroad men of the country that on account of the cost of track construction supplemental city service could best be furnished by buses.

Commission Demands Further Improvements

In a letter to Franklin T. Griffith, president of the Portland Railway, Light & Power Company, Portland, Ore., the Public Service Commission demands that the company expend during 1922 the sum of \$500,000 in maintenance, construction and reconstruction work. The letter stated that during the hearing held in February, 1920, and preceding the issuance of an order increasing car fares there had been filed with the commission certain expenditures in the amount of \$819,950 necessary to the rehabilitation of the company's trackage layout. Further, that as of Dec. 31, 1921, there had been expended upon the items set out in the exhibit the sum of \$386,470, with an additional \$78,000 on track reconstruction. Expenditures during 1921, with maintenance added, will bring the total expenditures on reconstruction and maintenance somewhat in excess of \$520,000. The letter states that the investigation convinces the commission that it can equitably require the expenditure of a sum of not less than \$500,000 on maintenance and construction in 1922.

Nashua Property Making Good Progress

The part electric railways play in the life of a community with some salient facts about this method of transportation as an industry was made the subject of an interesting and instructive talk recently at the Nashua, N. H. Country Club. The remarks were contributed by three well-known men in the railway industry, Edward Dana, general manager of the Boston Elevated Railway, W. H. Burke of the Stone & Webster management division, also of Boston and J. A. Queeney of the Railway Sales department of the General Electric Company, Schenectady, N. Y. Through the influence of E. W. Holst, engineer of the Nashua Street Railway, these three men were brought to Nashua.

Mr. Queeney took occasion to remark that under the two years' guidance of Mr. Holst the Nashua Street Railway had made rapid strides and that it was only a comparatively short time ago when the system was on the red ink side of the ledger. Some of the outstanding topics discussed at the recent Mid-Year Meeting of the American Electric Railway Association at Indianapolis, Ind., were referred to by Mr. Dana in his talk. He also gave some facts about the Boston Elevated Railway, commenting on its financial condition for the last year and declaring that it was on the principle that patrons of the road and not the general public should pay for the cost of their transportation, that the present board was operating reducing fare costs where practical. Mr. Burke gave some interesting statistics on the railway industry at the beginning of the inflation period and by means of a chart showed labor costs, revenues, etc. He said that the number of passengers had increased steadily on the average in recent years in a ratio of about 10 per cent.

Railway Unable to Perform Paving Work

President Wheelwright of the Virginia Railway & Power Company, Richmond, Va., has informed the Director of Public Works that owing to its serious financial condition his company will be unable to meet the franchise provision calling for an expenditure of \$225,000 for paving and re-laying of tracks. Accordingly Director Saville announced that the entire paving scheme for the year under the Glen bond issue would have to be revised.

In his letter expressing his regrets to Mr. Saville, Mr. Wheelwright said it was embarrassing for the management to have to take the position ostensibly of "laying down" since this procedure was far from its desire. In alluding to the company's financial condition he said that for the past year to Jan. 1 the company had failed to earn bond interest and taxes on the Richmond street railways by the sum of \$297,057 and that for the past two months the situation had become acute. He said

that the Council's failure to meet the urgent pleas of the company for relief in the matter of fares and franchises had been responsible for the railway situation in Richmond steadily growing worse.

Arbitration Board Deadlocked

No indication is forthcoming as to the prospects of a settlement of the Indiana, Columbus & Eastern traction line wage dispute by the arbitration board, which at present is deadlocked on the appointment of a third member. The line was a part of the Ohio Electric Railway before that system went into the hands of receivers. S. H. Hutchins, Columbus, Ohio, and C. W. Rich, Springfield, the two arbitrators, plan to hold a meeting soon in an effort to select the third man. Mr. Hutchins is also a member of the arbitration board which is attempting to solve the wage dispute between the company and its employees on the city lines in Lima, Ohio. The others on the Lima board are: C. A. Anderson, Lima attorney, and John Sweeney, Lima contractor. The old wage scale was 46 cents an hour. This is being continued pending settlement of the dispute. The company is proposing a reduction in the rate.

Investigation Made Into Serious Accident

An investigation is being made by Jerome Kuertz, Director of Street Railways, and officials of the Cincinnati (Ohio) Traction Company to determine the cause of an accident on one of the company's cars on March 24, which cost the life of a woman and injured nine other passengers. The accident occurred when a Clifton-Ludlow car got beyond control and slid down Clifton Avenue, one of the deepest grades in the city used for electric railway transportation, and crashed into a Vine-Burnet car.

Walter Draper, vice-president of the traction company, after viewing the scene of the accident and inspecting the car upon its arrival at the carhouse, said that the mishap was one of those things which could not be avoided, despite precautions. Both Mr. Draper and Commissioner Kuertz said that from all appearances both the motorman and conductor used every preventive to stop the car when it started on its runaway flight.

Condemns Radial Legislation

The Council of St. Catharines, Ont., unanimously indorsed a report of its special railway committee, in which hydro-radial legislation contemplated by the provincial government was condemned as prejudicial to the rights and vested interests of municipal corporations. The government was urged to take no further action toward nullifying previous hydro-radial enactments until a conference has been held between the government, the Hydro Electric Power Commission and the municipalities concerned.

News Notes

Association Formed.—An employees' association has been formed among the people employed by the Olean, Bradford & Salamanca Railway, Olean, N. Y. John Nutt, Olean, is president, assisted by an executive committee of eleven men.

Men Accept Present Scale.—Employees of the Scranton (Pa.) Railway have voted to renew their wage contract for another year. The agreement continues in effect until April 1, 1923. The company refused the men's request for an increase of 6 cents an hour.

Get Together Features Fun.—The Beaver Valley Traction Company, New Brighton, Pa., held a get-together of all employees and their families recently. In the language of the circus, the big show was at 7:30 p.m., but for late men a meeting was held at 1 p.m. At the evening gathering there were music, singing, monologues, readings, speeches, and other fun. A safety exhibit was a main feature of the evening.

Car Runs Down Hill.—The brakes of a Belt line car of the Public Service Railway failed to work on the up-grade on Newark Avenue, Jersey City, N. J., on March 28 and the car started down the hill, smashing into a loaded one-man Hudson line car. Twenty-four people suffered injuries. At the office of John F. O'Toole, assistant to the president of the Public Service Railway, it was said that it was not known just what the trouble was but that an investigation was being made.

Read "Service News."—In order to acquaint its employees with information about the company doings and other news the Savannah Electric & Power Company, Savannah, Ga., is publishing a monthly bulletin entitled *Service News*. The issues, distributed among the employees each month, contain some effective suggestions such as "Cultivate the feeling that the company wants to please its patrons," "Smilingly sell safe, satisfactory service" and "Courtesy Kurtails Kicks."

Wages Reduced.—A reduction of 7 cents an hour in wages paid motormen was made April 1 by the Pine Bluff (Ark.) Company. Reductions will also be put into effect with all other employees of the railway department. The reduction was caused by a recent City Council ordinance requiring the company to reduce fares from 7 to 6 cents for cash fares. Motormen, who also serve as conductors, were paid 36 to 46 cents an hour. The new scale is 29 to 39 cents an hour. The motormen are on duty from ten to eleven hours each day, working seven days. This is the first reduction in wages made by the Pine Bluff company since 1918.

Financial and Corporate

Interurban to Be Sold

One of Oldest Traction Companies Is Unable to Continue Selling of Service—Cars and Track Only Assets

The stroke of midnight on March 25 tolled the passing of one of Cincinnati's oldest traction companies, the Interurban Railway & Terminal Company, with its Cincinnati (Ohio) terminal on Sycamore Street. For many years now the traction company has fought a losing fight, steadily working always with the debit side outweighing the credit side. The discontinuance of the Interurban Railway & Terminal Company follows much litigation by bondholders of the company, who won their fight to have the road closed and the property sold to the highest bidder. A month ago the State Public Utilities Commission granted a committee of bondholders authority to abandon the line. The cars and rolling stock will be placed on the market and the tracks torn up and sold for scrap. The passing of the Interurban Railway & Terminal Company also marks the disappearance of electric railway transportation between Cincinnati and New Richmond and Cincinnati and Lebanon.

When the interurban boom of the late '90s reached its zenith a company was formed in 1898 called the Cincinnati & Eastern Electric Company. It built an interurban line to New Richmond. Then in 1899 another company was formed called the Suburban Traction Company. It built a line part way to Bethel, Ohio, through Mount Washington. Still another company, the Rapid Railway, built a traction line to Lebanon, Ohio. Finally, in November, 1902, these companies consolidated as the Interurban Railway & Terminal Company and elected George R. Scrugham, president. Associated with Mr. Scrugham were W. E. Hutton, Charles H. Davis, Leo H. Brooks, deceased; George H. Worthington and others.

Two disastrous fires are part of the history of the Interurban Railway & Terminal Company. One destroyed the Sycamore Street terminal, with a loss of \$100,000, and the other destroyed the carhouse at Coney Island with a loss of nearly \$75,000. The company's chief asset will be its track and rolling stock.

Brooklyn Company Rejects Commission's Valuation Invitation

The Brooklyn (N. Y.) City Railroad on March 27 made public a resolution adopted by its board of directors regarding the appraisal of the valuation bureau of the New York Transit Commission. The resolution, passed at a board meeting on March 17, followed a general discussion by the directors of an outline of the appraisal presented by Vice-President H. Hobart Porter.

The directors believe that for reasons they set forth in detail they are not justified in expending the large amount of money necessary to examine and analyze the valuations referred to in the letter of the commission of Feb. 23 and to prepare the detailed criticism and objections which are invited.

Improved Conditions Continue

The Muskegon Traction & Lighting Company, Muskegon, Mich., is keeping up the good work started in January. As a result of that month's operation the company actually showed net earnings, but after interest charges a deficit remains. In February there was a balance after interest charges amounting to \$32.43. For two months the electric railway has been operating without bus competition and has shown that it can meet its expenses better when the bus, as competitor, has been removed. The company carried 338,659 passengers in February. The improved business conditions on this property were referred to in the ELECTRIC RAILWAY JOURNAL, issue of March 11.

Deficit After Dividends

During 1921 the Omaha & Council Bluffs Street Railway, Omaha, Neb., carried 68,726,479 revenue passengers, as against 72,055,229 during 1920. Passengers carried on transfers: 1921, 18,907,734; 1920, 18,938,721.

The financial statements for 1921 and 1920 follow:

	1921	1920
Revenue from transportation	\$4,262,852	\$4,497,728
Other revenues	352,737	309,801
	\$4,615,589	\$4,807,529
Operating expenses	3,482,284	3,603,678
Net operating revenue	\$1,133,305	\$1,203,851
Taxes assignable to railway operations	437,620	427,862
Operating income	\$695,685	\$775,989
Plus non-operating income	38,966	29,914
Gross income	\$734,651	\$805,903
Total deductions from gross	637,457	637,490
Net income	\$97,194	\$168,414
Profit and loss adjustments	18,207	7,552
Adjusted net income	\$78,986	\$160,861
Preferred stock dividend requirements	200,000	20,000
Deficit	\$121,013	\$39,139

The total expenditure for additions and betterments during 1921 was \$51,848, consisting mostly of costs of paving streets not previously improved and also laying heavier rails.

In its physical valuation reports now being considered by the Nebraska State Railway Commission for rate-making purposes, the company shows the following valuation totals for the system:

Four-year average, \$21,740,254; 1919 reproduction, \$25,126,177; present value (as of Sept. 1, 1919), \$23,291,772.

Friendly Suit to Foreclose Commenced

Suit in foreclosure of a mortgage securing bonds amounting to \$150,000 against the People's Traction Company which operates the interurban line between Galesburg and Abingdon, Ill. has been filed by C. S. Harris in the Circuit Court, naming the Western Railways & Light Company, the People's Traction Company, the Galesburg Railway, Lighting & Power Company, and other companies concerned, as defendants. The suit is a friendly one brought by the bondholders merely to protect their interest and speed up the negotiations for the exchange of securities now in progress.

The suit is brought in the name of the People's Trust & Savings Bank, Galesburg, trustee for the bondholders two-thirds of the bondholders having made written request of the trustee to protect their interests by foreclosure of the mortgage.

All's Not Well in Radford

Electric railway service was suspended temporarily in Radford, Va., as a result of a controversy in which City Council, the Radford Water Power Company, which operates the street railway, and the jitneys are involved. Trouble began when a bus operator began carrying passengers between Radford and East Radford for 5 cents after the railway had secured the approval of the City Council to put into effect a 7-cent fare. Accordingly the railway reduced its fare to 5 cents and the bus operator carried passengers for what they gave him. That evidently was the last straw or ride in this case as the car was put in the carhouse. It is stated that the jitney operator will be allowed to run his bus until his license expires in May.

Successor Company Organized at Lafayette

Articles of incorporation were filed with the Secretary of State on March 24 by the Lafayette (Ind.) Street Railway Company, Inc., the concern that is taking over the local lines at Lafayette, sold under foreclosure recently. The capital stock is \$250,000 and Julius Berlovitz, Richard B. Sample, Charles L. Murdock, J. G. McKee and Allison E. Stuart are named as directors.

The directors have named the following officers: President, Julius Berlovitz; secretary, J. G. McKee; treasurer, Charles L. Murdock. Mr. McKee is a former traction line auditor, and was employed on the Murdock lines for several years. Mr. Murdock is the son of Charles M. Murdock, president of the First Merchants National Bank.

It was stated recently that a deed to the property recently purchased by the company will be issued April 1, and plans have already been made for the rehabilitation of the car lines. Engineers are now negotiating with various companies for rails, cars and other new equipment.

London Outlook Cheerful

Chairman of Underground Railway Group Looks Forward to Gradual Improvement in Future

In the latter part of February there were issued the directors' reports and accounts for 1921 of the London "common fund" companies. These are the Metropolitan District Railway, London Electric Railway, the City & South London Railway, the Central London Railway, and the London General Omnibus Companies. Over all the companies had a specially successful year,

the five companies was £13,085,557. Their revenue liabilities, namely working expenses, rent, rent charges, interest on loans, debentures, guaranteed and preference stocks, and reserves for depreciation and obsolescence, amounted to £12,176,285, leaving £909,272 for the common fund, to be distributed among the companies in percentages fixed by agreements. The Metropolitan District got £109,113, the London Electric £320,552, the City & South London £54,556, the Central London £104,483 and the London General Omnibus Company £260,568.

be a joint meeting, as many of his remarks are applicable to all the companies. In addressing the shareholders of the Metropolitan District Railway he said that if it had not been for the coal strike from April to June of last year and the subsequent trade depression, the results from the increased fares in London would have reached expectations.

The volume of traffic in London was a barometer measuring the country's prosperity. Lord Ashfield set out in detail the proposals he had made to the Government last autumn for relieving

PARTICULARS OF PASSENGERS CARRIED, NUMBER OF CAR-MILES RUN, ETC., OF LONDON GROUP IN YEAR 1921 COMPARED WITH YEAR 1920

	Metropolitan District Railway		London Electric Railway		City & South London Railway		Central London Railway		London General Omnibus Company Limited		Total	
	1921	Increase+ or Decrease—	1921	Increase+ or Decrease—	1921	Increase+ or Decrease—	1921	Increase+ or Decrease—	1921	Increase+ or Decrease—	1921	Increase+ or Decrease—
Passengers carried—												
Ordinary	80,122,744	—15,197,435	94,678,210	—18,025,516	21,824,780	—4,618,959	32,628,737	—6,700,236	761,251,405	—6,702,244	990,505,876	—51,244,390
Workmen	22,524,130	—1,814,166	19,024,844	—13,921,312	7,390,284	—4,620,941	3,873,388	—663,284			52,812,646	—21,019,703
Season...	27,666,850	—374,015	19,317,850	+377,630	2,611,700	—72,228	6,963,000	+508,760			56,559,400	+440,147
Total	130,313,724	—17,385,616	133,020,904	—31,569,198	31,826,764	—9,312,128	43,465,125	—6,854,760	761,251,405	—6,702,244	1,099,877,922	—71,823,946
Number of car-miles run in relation to traffic receipts	18,416,940	—1,145,551	24,727,829	—3,134,634	6,897,970	—493,839	7,728,525	—340,520	86,858,559	+1,015,467	144,629,823	—4,099,077
mileage of lines owned (first track)...	M. Ch. 24 68		M. Ch. 23 77		M. Ch. 7 26		M. Ch. 5 70		M. Ch. 63 1		M. Ch.	

largely owing to increased fares, and dividends—though nothing to boast about in an absolute sense—were exceptionally high. The ordinary stock of the District Railway got a dividend of 1 per cent—the first on this stock for many years. The gross revenue for the year of

The accompanying tables show the working results for each company. Lord Ashfield spent an arduous day in presiding and delivering his chairman's address at each of the five meetings of the companies in the London "combine." It was no wonder that he suggested that in future there should

unemployment by carrying out the authorized developments of the underground system, if the Government would guarantee the new capital (as provided for in the Trade Facilities Act) and if the Government would secure the General Omnibus Company against piratical competition for ten years.

COMPARATIVE STATEMENT OF THE OPERATIONS OF THE FIVE COMPANIES IN LONDON, PARTIES TO THE AGREEMENT AND SUPPLEMENTAL AGREEMENT MADE UNDER THE LONDON ELECTRIC RAILWAY COMPANIES' FACILITIES ACT (1915) YEAR 1921 COMPARED WITH YEAR 1920

	Metropolitan District Railway		London Electric Railway		City and South London Railway		Central London Railway		London General Omnibus Company Limited		Total	
	1921	Increase+ or Decrease—	1921	Increase+ or Decrease—	1921	Increase+ or Decrease—	1921	Increase+ or Decrease—	1921	Increase+ or Decrease—	1921	Increase+ or Decrease—
Traffic receipts after the operation of the common fund under the terms of the London Electric Railway Companies' facilities act agreement, dated Dec. 21, 1915, and supplemental agreement, dated Dec. 8, 1921.	1,849,581		2,040,010	+223,091	446,999	+19,008	661,479	+83,096	7,500,572	+566,241	12,498,641	
Expenditure	1,351,208		1,368,771	—18,523	301,441	—20,470	468,428	—16,704	6,936,082	+260,844	10,425,930	
Net receipts	498,373	+164,041	671,239	+241,614	145,558	+39,478	193,051	+99,800	564,490	+305,397	2,072,711	+850,330
Isocellaneous receipts (net)	164,180	—41,328	136,804	+1,868	34,309	+2,000	68,071	—5,247	183,552	—64,376	586,916	—107,083
Net income	662,553	+122,713	808,043	+243,482	179,867	+41,478	261,122	+94,553	748,042	+241,021	2,659,627	+743,247
Interest, rentals and other fixed charges	326,760	—611	295,544	+9,278	46,811	—2,808	46,039	—8,032	152,474	+43,890	867,628	+41,717
Balance	335,793	+123,324	512,499	+234,204	133,056	+44,286	215,083	+102,585	595,568	+197,131	1,791,999	+701,530
Reserve for contingencies and renewals	65,000	+20,000	65,000	+20,000	36,000	+11,000	29,000	+9,000	335,000	+50,000	530,000	+110,000
Balance	270,793	+103,324	447,499	+214,204	97,056	+33,286	186,083	+93,585	260,568	+147,131	1,261,999	+591,530
Dividends on guaranteed and preference stock	198,430	+29,400	126,947		42,500		21,600				389,477	+29,400
Balance	72,363	+73,924	320,552	+214,204	54,556	+33,286	164,483	+93,585	260,568	+147,131	872,522	+562,130
Old balances from last year's accounts	20,537	—1,561	22,350	+1,408	18,820	—930	15,161	+3,399	58,843	—883	135,711	+1,433
Total amount available for dividends and further reserves	92,900	+72,363	342,902	+215,612	73,376	+32,356	179,644	+96,984	319,411	+146,248	1,008,233	+563,563
Dividends on ordinary stocks and shares	32,350	+32,350	303,158	+198,219	48,100	+25,900	120,000	+52,500	251,483	+137,163	755,091	+446,132
Rate per cent.	1%	+1%	3½%	+2½%	3½%	+1½%	4%	+1½%	(Free of tax)	(Free of tax)	3.92%	+2.26%
Dividends carried forward to next year's accounts	60,550	+40,013	39,744	+17,393	25,276	+6,456	59,644	+44,484	67,928	+9,085	253,142	+117,431

Note—In consequence of the Government control of the Metropolitan District Railway in 1920, the traffic receipts and expenditures for that year are not comparable with those for the year 1921 and are omitted. In the previous year the receipts included £705,347 received as Government compensation.

As the Government declined to agree, a revised scheme had been sent in, and he hoped it would be accepted. Meantime the nature of it could not be disclosed. Expenditure on capital account of £707,000 had been incurred during the year for new rolling stock. In spite of current prices being at the maximum, it was impossible to refrain from ordering new cars, in view of the congestion of traffic. The price was 275 per cent above the pre-war price. To help to meet the cost a temporary loan of £400,000 was obtained from the company's bankers. New overhaul shops for all underground railways were being built at Acton at an estimated cost of £350,000.

FALL IN WAGES

In regard to the fact that a dividend (1 per cent) was being declared on the ordinary stock of the company (which very rarely receives any dividend) he said that it was practically paid out of the proceeds of the second half of the year, and arose largely from the distribution of the common fund of the associated companies having been revised as from July 1, 1921. In general, he considered the results for the year extremely satisfactory. This was the first time since 1882 that the company had declared a dividend on its ordinary stock and on that occasion the distribution was only three-sixteenths per cent. He had reason to hope that it would be possible gradually to increase the dividend in future years.

At the meeting of the London Electric Railway, Lord Ashfield, referring to the reductions in wages under the sliding scale as cost of living fell, said that the reductions in wages during 1921 meant a saving of £240,000 to the four associated railways. As for the fall in prices of materials, it occurred rather late in last year, and as the associated companies carried large stocks the benefit from the fall has hardly accrued. The average price of coal last year was 52s. 6d. per ton. For the current year to date the cost was less than 32s. 6d. per ton. The one factor which prejudiced the situation was a heavy falling off in the volume of traffic. However, the economies that could now be counted on would appear sufficient to maintain the companies in their present position, so that when the revival came, the companies should occupy a strong position.

AN UNPROFITABLE EXTENSION

At the Central London Railway meeting Lord Ashfield said that 1921 was the first year during which the extension railway from Shepherd's Bush to Ealing had been continuously worked. Under an agreement with the Great Western Railway that company maintained the railway and worked the train service. For doing this the company received a share of the traffic receipts. This share had barely been sufficient to meet the expenses, and the results were very disappointing. The number of passengers carried during the year was about

3,200,000, while the number of passengers using the Ealing stations and the Metropolitan District Railway was more than 9,000,000. The discrepancy was due to the higher fares on the new route. The rates in vogue there were necessitated by the fact that the new railway was a part of the Great Western Railway, on which the fares were 75 per cent in advance of the pre-war rate. Negotiations were in progress for an adjustment of fares.

BIGGER TUNNELS NEEDED

At the City & South London Railway meeting, Lord Ashfield said the conditions had not been favorable for the company making a start for the reconstruction of the railway (particularly for enlarging the tunnels which are smaller than those on the other and more modern tube railways). The number of passengers for the year showed a decline of 23 per cent and the drop was more severe than in the case of any of the other railways in the group. It was hoped that an application for guarantee of additional capital by the Government under the Trade Facilities Act would be obtained. In looking to the future, he saw no reason why the position of the company should not improve.

The brief abstract just given indicates that with reviving trade and a maintenance of present fares until circumstances justify their reduction the underground companies should do fairly well.

More Rolling Stock Purchased Under Equipment Trust Plan

Putnam & Company, Hartford, Conn., are offering for subscription \$171,000 of Connecticut Company equipment trust 5 per cent gold notes Series E. The trustee of the issue is the Security Trust Company, Hartford. The notes are dated April 1, 1922, and will mature in twenty semi-annual installments. They were offered at prices to yield about 5.35 per cent.

These notes are a direct obligation of the Connecticut Company under an equipment trust agreement between it and the Security Trust Company of Hartford, Conn., trustee. The title to the equipment under this agreement remains with the trustee until both principal and interest of all notes shall have been paid in full.

The total cost of the equipment is \$229,000, of which 25 per cent, or \$58,000 will be paid in cash. The notes therefore represent 75 per cent of the purchase price. The equipment consists of thirty-five standard 28 ft. single-truck steel safety cars with air-brakes and two 25 h.p. motors, each car having a seating capacity of thirty-two passengers, and three 40 ft. double-truck steel safety cars with air-brakes and four 25 h.p. motors, each seating fifty-two passengers. These cars are of the most modern design and construction. The double-truck safety cars are in use on the line between Torrington and Winsted, 12 miles distant. They were described in the ELECTRIC

RAILWAY JOURNAL of Feb. 18, page 276.

Previous issues of the equipment notes were as follows:

Series A	Dated Oct. 15, 1915
Series B	" Sept. 15, 1916
Series C	" Jan. 15, 1920
Series D	" May 15, 1920

Of these Series A and B have been paid in full, while of Series C \$45,000 has matured and been paid and of Series D \$26,000 has matured and been paid.

The bankers point out that the company paid about \$850,000 of these notes during the worst period of electric traction business, and that cash to meet these maturities has always been deposited with the trustee in advance of the due date. It is also explained that on July 15, 1922, there will be due from the company to the State of Connecticut about \$778,000, of which \$363,000 covers funded tax obligations, and \$415,000 is on account of current taxes. To meet these payments the company has a cash reserve of \$650,000. The balance is to be provided for during the next three months.

Financial News Notes

Loss Continues.—Filing of the regular monthly report for February of the operations of the Springfield (Ohio) Street Railway with the city manager, on March 25, reveals that the company has made no financial improvement over the month of January. A loss of \$4,579 was sustained in February, as compared to a loss of \$5,704 for January.

Property Sold.—Property of the Conway Street Railway, extending from Conway, Mass., to South River, on the Fitchburg line, a distance of 7 miles, operation of which ceased some time ago, has been sold to H. Jacob & Son, junk dealers, North Adams. The dealers said they would try to resell it as it stands.

Nueces Company Reorganizes.—The Nueces Railway, Corpus Christi, Tex., which owns and operates the street car lines of that city, has been organized with a capital stock of \$10,000. Incorporators are R. W. Morrison, E. H. Eldridge and E. R. Kleberg. The trolley lines in Corpus Christi have not been operated since the fire destroyed the power plant several weeks ago. The power plant is being rebuilt.

Surplus of \$656,226.—The West Penn Traction & Water Power Company, Pittsburgh, Pa., and its subsidiaries report gross earnings for the year ended Dec. 31, 1921, of \$14,189,776, an increase of \$581,827 over the earnings a year ago. The operating expenses decreased nearly \$6,000. The net income increased from \$1,256,495 in 1920 to \$1,464,508 in 1921. After deducting preferred dividends amounting to \$808,282 a surplus remained of \$656,226.

Traffic and Transportation

Fares Reduced on Some Eastern Massachusetts Divisions

Fare reductions and zone extensions will go into effect on April 21 in the Lynn, Salem, Lawrence and Brockton districts of the Eastern Massachusetts Street Railway.

The trustees say that the Salem, Brockton, Lawrence and Lynn districts have been making the best financial showing during the past few months and in accordance with the service-at-cost plan under which the road is operating they are entitled to the lower fares.

In the Lawrence district, tickets will be sold at the rate of seventeen rides for 95 cents; in Salem at the rate of seventeen rides for \$1, and in Lynn at the rate of nineteen rides for \$1 or 5 cents a ride.

A twelve ride \$1 ticket will be issued in Methuen and other outlying towns in the Lawrence district, where the city fare now is 10 cents cash. In the Brockton district, a fourteen ride, \$1 zone ticket to surrounding towns is increased to fifteen rides. The city zone ticket remains good for seventeen rides for \$1.

Lower Fares Issue of Election

Immediate action for lower fares at Hartford, Conn., is among the items in the platform of the Democratic party for the municipal election that will take place on April 4. Richard J. Kinsella, Democratic nominee for Mayor, says, if elected, he will favor and insist upon a reduction of 25 per cent, or four fares for 25 cents instead of three, the present rate. The salient features of his platform are:

- 1. Reduce fares at once to four fares for a quarter.
- 2. Have Hartford division separated from the system as a unit for computing operating costs and receipts.
- 3. Decrease overhead by curtailing suburban trolley service during "hollow" hours of the day and night.
- 4. Maintain receipts in Hartford by improved service during rush hours and by increased number of passengers due to lower fares.

It is argued that the Republican administration has opposed action looking toward lower fares in Hartford. Decreasing the overhead expense, the Democratic nominee declares, would not work a hardship on the trolley system financially.

Pass Plan in Effect

The Cedar Rapids & Marion City Railway, Cedar Rapids, Iowa, has installed the monthly personal pass to give a reduced rate to regular riders. The line runs from the business district of Cedar Rapids to the suburb of Kenwood, thence to Marion City, a distance of 6 miles. A one-way cash fare is 18 cents, but books containing ten tickets are sold

for \$1.50. Under the pass plan a person who pays \$1 a month will be entitled to ride at 10 cents per ride. Thus, if he rides twice each working day, or fifty times a month, his fare will be 12 cents instead of 18 cents. The plan went into effect on March 15.

Misunderstandings Cleared Up

Virtually all points of difference between the California State Railroad Commission and the Los Angeles Board of Public Utilities were settled on March 22 at a conference of members of the two bodies, it was announced by representatives of each, and assurances were given that closer co-operation between the commission and the board would follow.

Friendly suits, as previously requested by the Railroad Commission in a letter to the board, to test the question of jurisdiction over utilities in Los Angeles will be instituted either by the Railroad Commission or by the Board of Public Utilities, according to J. D. Kennedy of the utilities board, who stated that the conference held in the office of President Brundige of the commission "has resulted in a closer relationship and a far better understanding of our respective functions."

The first of these suits is expected to follow a decision by the Railroad Commission on a petition from the Hollywood Board of Trade asking that the Los Angeles Railway Corporation be required to extend five of its lines into the Hollywood district to compete with the Pacific Electric lines, which serve Hollywood exclusively. The Los Angeles Railway lines have a 5-cent fare and the Hollywood Board of Trade petitioned this service in face of the 10-cent fare charged by the Pacific Electric Railway, and as granted by the Railroad Commission in its decision of Dec. 24, 1921, for increased fares on the various lines of the Pacific Electric Railway.

The attorney for the Hollywood Board of Trade at the rehearing of the Pacific Electric Hollywood rate case, held on March 20, 21, 22 and 23, set forth that the commission has the authority to order the Los Angeles Railway to extend its lines into Hollywood, while opposing counsel of the Los Angeles Railway set forth certain arguments and court rulings that neither the State Railroad Commission nor Los Angeles Board of Public Utilities had the authority or legal power to order these line extensions. Ex-commissioner Edgerton and former president of the State Railroad Commission represented the Los Angeles Railway Corporation as special counsel in arguing against the petition of the Hollywood Board of Trade to the commission to order these extensions of lines.

Reduction in Round-Trip Tickets Announced

New tariffs have been filed with the Public Service Commission by the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., providing for reduced rates to Clinton, Brazil, Paris, Sullivan and other points. When asked about the reduction, General Manager E. W. Walker said that it was the intention of the traction company to meet the desire of the people for cheaper transportation by putting into effect greatly reduced round-trip rates. He said in part:

The company has been catering to the transportation needs of Terre Haute and vicinity for very nearly a half century; it will celebrate its fiftieth anniversary in 1926. Its stockholders have invested millions of dollars in building up a plant and equipment, and it has never expected to make any money other than by legitimately meeting the needs of the community for transportation, and doing this at a price which would stimulate the freest use of the facilities provided. Its investment is a fixed investment, and it has no opportunity during dull times to pull up stakes and move to another place.

Looking back over the last few years, during which we have heard so much about the high cost of living, it will be remembered that only in the case of interurban fares has the Traction company at Terre Haute contributed to this high cost of living. These fares were increased by general order of the Public Service Commission at the time fares and charges were being increased by the federal government on the steam railroads. Its fare on the city street car lines is the same now as it was in 1866, and has never been higher.

Mr. Walker said that the reduced rates were voluntary on the part of the company and would become effective on March 28.

Railway Is Entitled to Higher Rate

H. F. Dicke, general manager of the Utah Light & Traction, Salt Lake City, Utah, in answer to a petition of Charles Anderson and others seeking a return to the old 5-cent fare schedule states that his company is entitled to higher fare and if the Anderson petition is pressed, he will solicit the commission for such fare increase. In his opinion instead of decreasing the rate of fare the company is entitled to an 8-cent cash rate with tickets selling for 7½ cents. He states that he is not asking for this rate at this time but reserves the right to file petition for such increase if the case proceeds to a hearing.

In the company's affirmative defense, additional investments are said to have raised the valuation of the company's property from the \$8,468,278, fixed by the utilities commission Jan. 15, 1920, to \$8,721,485 at the first of the present year. Operating costs in 1919 are said to have been \$1,395,752, in 1920 \$1,634,008, and in 1921, \$1,747,253. At the same time the number of revenue passengers increased from 33,908,484 in 1919 to 34,710,922 in 1920 and then dropped off to 31,135,305 in 1921, while decreases are again shown for the present year of 236,257 in January, 213,019 in February and 79,660 in the first half of March. Unless a change comes, it is predicted, the company may not expect more than 30,000,000 revenue passengers for 1922.

Interstate Act Interpreted

Court Issues Temporary Injunction in Which Jurisdiction of I. C. C. Over Electric Lines Is Denied

Ordinarily the electric railway engaged in interstate commerce does not come under the jurisdiction of the Interstate Commerce Commission. In order to do so the electric railway must be operated as a part or parts of a general steam railroad system of transportation, must be engaged in the general business of transporting freight in addition to its passenger and express business, or it must be operated as part of a general steam railroad system of transportation or be engaged in the general transportation of freight. If a road is not thus engaged or being thus operated it is not within the Interstate Commerce Act nor within the jurisdiction conferred on the Interstate Commerce Commission, even though the road may be engaged in interstate passenger business.

This, in short, is the ruling just made by Circuit Judge Donahue and District Judges Killits and Westenhaver in the District Court of the United States for the Northern District of Ohio, Eastern Division, in the case of the village of Hubbard against the United States of America, the Interstate Commerce Commission and the Pennsylvania-Ohio Power & Light Company. To the court it seemed that the interpretation just mentioned was the only proper one and the effect of several amendments to the Interstate Commerce Act made since the decision in the so-called Omaha Street Railway case.

With respect to the general principles governing the matter the court says:

The establishment of the Labor Board to settle controversies between carriers and employees, the guaranty for a limited period of a fixed return upon railroads, the grouping of railroads into classes and requiring rates to be fixed so as to allow a fair return to be earned on the property as a whole, the control assumed and exercised over the construction of new railroads, and the making of extensions and the issuance and sale of securities, are all parts of a general scheme from which all street or interurban electric railways are excluded unless possessing these characteristics.

With respect to the line of the Pennsylvania-Ohio Electric Company the court says that "plainly and admittedly the defendant railway was not operated as a part of a general system of steam railroads for transportation." After referring to the fact that the freight service of the company appeared to consist of packages and parcels and that this service was more nearly like what is called express than freight traffic, such an incidental and relatively insignificant and unimportant freight business could not be called the general transportation of freight in addition to the company's express business. The conclusion of the court was to the effect that the order of the Interstate Commerce Commission was in excess of any power and jurisdiction conferred upon it by the Interstate Commerce Act and that the order of that body assuming jurisdiction is void and without effect.

In consequence the court signified that "the motion to dismiss will be denied and a preliminary injunction will be granted as prayed."

The court also ruled that in the case of the South Covington & Cincinnati Street Railway, cited by the defendant, the decision was wholly inapplicable and dealt with entirely different questions.

The Interstate Commerce Commission decided last fall that the franchise contract entered into between the predecessor of the Pennsylvania-Ohio Power & Light Company and the village of Hubbard, Ohio, fixing the rates between Youngstown and Hubbard was without effect where the rates so fixed resulted in unjust discrimination against interstate commerce. In consequence the Youngstown company was ordered by the commission to increase its rates by putting into effect upon five days notice a one-way cash fare of not less than 20 cents between Youngstown and Hubbard, and a commutation rate of not less than \$5 for fifty-four rides. In the words of the commission the company was directed "to cease and desist from practicing the undue prejudice, undue preference and advantage found to exist in the relation of intrastate to interstate passenger fares." The decision of the Interstate Commerce Commission was reviewed in the *ELECTRIC RAILWAY JOURNAL* for Dec. 17, 1921, page 1091.

Transportation News Notes

Fares Reduced.—Fares on the lines of the Pine Bluff (Ark.) Company were reduced 1 cent on March 22, the reduction being from 7 to 6 cents for cash fares. Five-cent fares may be secured by purchasing books of fifty tickets. An effort is also being made to secure 5-cent fares for school children. This reduction came as a result of an ordinance passed at a recent meeting of the City Council.

Freight Rates Cut.—Freight rate reductions were announced on March 15 by the Cincinnati & Dayton Traction Company to Detroit and other Michigan points on the same basis as steam railroads. Officials of the traction company in announcing the reduction said that the company would make second day delivery to Detroit and about three-day delivery to other Michigan cities. This reduction, it was stated, is effective not only in Detroit, but to points on other railways.

Getting Used to Tokens.—Since the Connecticut Company, New Haven, Conn., placed tokens on sale for transportation there has been a slight increase in travel on the company's lines in the Hartford Division. Manager Scott said that an increase was expected and that a gain, though trifling,

was noticeable. Those who are regular commuters on trolleys are now becoming accustomed to the purchase of tokens, although trolley men say it is surprising how many continue to pay the full 10-cent fare.

A Tower Will Guide You.—Baltimore Md., has become a City of Towers. To expedite the traffic this new device was recently put into service at Charles Street and North Avenue. When you are to move your vehicle a green light will be flashed, and a red light will warn you to stop. There is still another guide for you—watch the amber light. It indicates that a change is to be made. The tower at Charles Street and North Avenue is equipped with a siren which is sounded on the approach of fire engines.

Rehearing Denied.—Application by the city and county of Denver for rehearing of the rate case of the receiver of the Denver (Col.) Tramway has been denied by the United States Circuit Court of Appeals. The Appellate Court on Dec. 29, 1921, rendered an order sustaining the findings of the Federal District Court, which is the authority for the collection of the present rates of fare, and upholding the contention of the receiver that the franchise under which the company is operating is not a contract in so far as the rate of fare of 5 cents stipulated therein is concerned.

Commutation Tickets Reasonable.—The Public Service Commission of Pennsylvania dismissed the complaint of the patrons of the Pittsburgh, Harmony, Butler & New Castle Company, against the rates charged by the company. The commission found from the evidence submitted that the commutation ticket rates were reasonable and not discriminatory as compared with the cash fare rates. The company has established a zone basis of fares, with a minimum charge of 6 cents for each passenger. The zone rate is an average of 2.98 cents per mile. Tickets are sold in groups of forty-four and sixty, good on any part of the line. The charges are made upon the principle that the shorter the commutation distance, the larger the rate as compared with flat fares.

Wants jitneys Prohibited.—Electric railway service in North Little (Ark.) is threatened with discontinuance if the City Council fails to pass an ordinance prohibiting "jitneys" from running parallel with the car tracks within a distance of three blocks from the car route, and granting the company the exclusive right of operating buses on certain streets within the city limits. This is the ultimatum delivered by P. C. Warren, manager of the Inter-City Terminal Railway. He stated that the company lost \$2,240 during the month of February. D. H. Cantrell, president of the Little Rock Railway & Electric Company, represented the Inter-City Terminal Company at a recent City Council meeting. The matter will be taken up later and definitely decided.

Personal Mention

Frank H. Warren, Editor

Indianian With Keen Sense of the Verities Put Into Job Fitting His Natural Talents

Two events stand out like Mars at perihelion in the life of Frank H. Warren, claim agent of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind. The most important event of his life, of course, occurred on Jan. 8, 1878, when he was introduced to the world about 20 miles east of the Indianapolis Street Railway. The next important event came almost forty-four years later to the day, when Mr. Warren received a check from the ELECTRIC RAILWAY JOURNAL for an article on salesmanship. The first event is of course a little hazy in Mr. Warren's mind, but he is dead sure that his celebration of the second event completely out-classed that of the first. In comparison with these two peaks, everything that happened in between sinks into insignificance.

FROM MAIL CLERK TO EDITOR

This is Mr. Warren's own estimate. Another event took place in his career, however, which others are inclined to think stands second only to the memorable event of 1878. It occurred a few days ago when Mr. Warren had trusted upon him the editorship of the *Safety Valve*, a real magazine for the employees of the company, the first issue dated February, 1922. Ever since 1878 Mr. Warren has been headed downward, but he didn't realize it until R. R. Smith, vice-president and general manager of the company, and other officers broke the news to him that he had been appointed editor of the company's new house organ.

It is said that all good men and the have either taught school or sold books. Mr. Warren confesses to having done both. In the course of that work he took a few vacations at normal schools and a university, along with some outside efforts, and finally succeeded in persuading Indiana University to give him two years credits. His education ended right there. He then took a correspondence course in which he learned about all the railroads in the world, later passed the examination for railway mail clerk, and went to work.

AN EXPERT ON NAMES

After learning the names of all post offices in that small section of the country west of the Alleghenies, Mr. Warren looked around for more worlds to conquer and seized on law as the next helpless victim. It took him just one year in a law office to master that subject, and then he became interested in claim work through an accident in the family. To Mr. Warren it looked like a pretty soft job. Throwing all

possible safeguards about his effort to get a job, Mr. Warren went to Elmer Slick of the Union Traction Company of Indiana and suggested to him that he would be a winner in Mr. Slick's department. This was slick work, of course, but after slinging mail for Uncle Sam all day and at the same time doing odd jobs for Elmer, Mr. Warren abandoned Uncle Sam to his fate in order formally to hook up with the Indiana Union. He put in

about five years with that company as assistant claim agent, and then spent about a year with the Interstate Public Service Company as safety agent. He then took a hand at selling, but what he really learned there was the wonderful stabilizing force of a salary. Then, Mr. Warren landed in the New York office of the Globe Indemnity Corporation and spent three months inquiring his way about in the Bronx and Brooklyn. It was about this time that Mr. Smith, general manager of the South Bend line, rescued Mr. Warren from his almost aimless wanderings and took him back to his Indiana home among the cornfields.

Claus Spreckels, New Manager at San Diego, Reviews Plans

Successor to Mr. Clayton at San Diego Not in Sympathy With California Association in Opposing Publication of "Bus Transportation"—
Prepared to Use Buses in San Diego

CLAUS SPRECKELS, the new general manager of the San Diego (Cal.) Electric Railway, chosen at the last annual meeting of the company, "grew up in the business," it might be said, as all of his business life has been spent in the employ of the company. He began service at the age of twenty years as a bookkeeper, in 1911 was elected secretary and treasurer of the company, and the next upward step made him general manager. He has succeeded William Clayton, who had been managing director of the company for twenty-one years.

Mr. Spreckels was born in San Francisco in 1888, and received his education in the public schools of that city. He is the son of John D. Spreckels, president of the San Diego Electric Railway and of the Arizona & San Diego Railway. Claus Spreckels looks on things in a practical light, and hence refused a chance for a college education and started work for the electric railway instead, so that he could "learn the business from the ground up."

LEARNING FROM THE GROUND UP

"I couldn't see where a knowledge of the classics would help me run the electric railway," he said, "and that is what I wanted most to do. Practical experience looked to me like a more sensible way to attain my object, so I got on the payroll and worked up, acquiring such technical knowledge as I needed by my own efforts."

Mr. Spreckels said there would be no radical change of policy in the company due to his selection as manager. His aim will be to give the best possible service with the revenue provided, but to eliminate lines that do not pay their way and substitute less costly service. In this connection he expressed a strong liking for the motor bus, or "motor street car," as he prefers to call it.

"I think the motor street car is bound to develop into the logical solution of

the transportation problem for districts where the traffic is not heavy enough to warrant building a trolley line," he said. "And as far as San Diego is concerned, we intend to meet all the needs for transportation. We are here to furnish transportation and we will do it."

"BUS TRANSPORTATION" MEETS REAL NEED

"And while on that subject, I want to say that I am not in sympathy with the position of the California association in opposing publication of BUS TRANSPORTATION by the McGraw-Hill Company. I think the new publication meets a need and furnishes transportation men all the latest developments in this latest means of transportation."

The new general manager got right into the middle of things when he took charge of the affairs of the company, and one of the first things he did was to announce a plan whereby the Adams Avenue line would be discontinued and replaced by a bus line. The residence suburbs of Normal Heights and Kensington Park, which are outside the city, are served by the Adams Avenue line, which was also within the city limits. The City Council gave approval to the plan subject to a satisfactory arrangement of details. However, residents of the two suburbs have entered vigorous protest against discontinuance of the electric trolley, and plans for the bus service have been temporarily halted to give the residents time to see if they can work out a plan they have proposed.

CITIZENS MUST PAY FOR PAVING

The company has agreed to consider a proposal to retain the trolley line on condition that residents relieve the company of all paving costs and to supply enough funds to the company to pay half of the cost of rebuilding the Adams Avenue line. This is esti-

mated at \$190,000, and the paving, it is estimated, will cost \$70,000. Thus it will be necessary for those wishing to retain the trolley service to raise \$165,000. It is proposed to issue stock in the railway company to the subscribers to the fund for rehabilitating the line.

Citizens active in the movement to retain street car service have estimated that between \$5,000,000 and \$6,000,000 is represented in the real estate investments dependent on the Adams Avenue line for transportation, and assert they can well afford to advance this sum rather than allow the company to tear up its tracks and put on motor buses.

The Adams Avenue line has a total of 2.35 miles. The present roadbed and track is in such bad shape that repairs are useless, owing to the nature of the ground, and reconstruction is imperative if cars are to continue in operation. Reconstruction, if undertaken, will be of the highest type track, with twin steel ties imbedded in concrete, the same as was used in reconstructing the Broadway line downtown a few months ago. Manager Spreckels stated that this type of work would be used for all reconstruction henceforth in San Diego.

A citizens' transportation commission, appointed by Mayor John Bacon shortly after his election last fall, and consisting of Stephen Bjornson, chairman; H. F. Worth, secretary, and James H. App, in a preliminary report to the City Council recommended that the company be allowed to substitute motor buses operating on Madison Avenue for the Adams Avenue line, and the City Council has given tentative consent.

BUS SERVICE MAY BE STARTED

Unless an agreement is reached with the citizens who are endeavoring to retain the trolley car service, Manager Spreckels announces, the bus service will be instituted. A bus has already been designed for the purpose, following the plans of Manager Spreckels, and a model of the car has been run over the proposed route. On the trial trip the full length of the Adams Avenue line was made in 12 minutes, including ten stops for discharging and receiving passengers. A 20-minute headway is maintained on the trolley line.

Other officers elected at the annual meeting of the San Diego Electric Railway Company were: John D. Spreckels, president; William Clayton, vice-president; Fred Whitehead, secretary; Read G. Dilworth, treasurer.

The same set of officers also was elected at the same time to occupy the same positions respectively in the Point Loma Electric Railway Company and the San Diego & Colorado Ferries Company.

William Clayton, retiring as managing head of the San Diego Electric Railway Company after twenty-one years of service, retired from the management in order to be relieved of

some of the active work, it was stated at his office. He recently celebrated his sixty-third birthday and feels he is entitled to a rest. Besides his duties as vice-president of the San Diego Electric Railway Company, Mr. Clayton retains executive control over some other of the Spreckels interests in San Diego, so has enough to do to keep him comfortably occupied. Claus Spreckels was his natural successor in the executive chair, as the young man will some day be called on to look after all of his father's large interests, and the management of the electric railway was considered the logical starting point.

Mr. Clayton is rather proud of his record of twenty-one years as executive of the San Diego Electric Railway with never a strike nor labor trouble of any kind, nor of any serious friction with the San Diego public.

Major Smith to Assist President

On the double quick Major Earl H. Smith has marched into two important executive positions. Though he is just



E. H. SMITH

forty-two and thus scarcely old enough to have more than handled one big job, Major Smith has mastered one and is well started on his second. For Major Smith is not only editor of the *Fairmont Times*, Fairmont, W. Va., a paper which he founded, but he is now tackling the job of acting as assistant to the president of the Monongahela Power & Railway Company. He will direct the public relations of the company, and have charge of publicity.

Though his new position is somewhat removed from his previous work, in reality Major Smith has simply exchanged the game of marbles for the game of discovering the public, for he has known the men who promoted the traction company since they hooked rides, cookies and holidays together.

Since leaving college Mr. Smith has spent most of his life in the newspaper game, and some time ago founded the *Fairmont Times*. He served in France during the European War, and upon his return assisted President Alexander in an informal way. He now becomes formally associated with the company.

Obituary

E. H. Ives

Edward H. Ives, assistant general superintendent of the Detroit (Mich.) United Railway, died on March 19 as a result of injuries received when an interurban train of the Detroit United Company struck the automobile which he was driving. His wife, three children and a friend were also killed.

Mr. Ives, with his family, was on the way to Capac, when the car skidded on the ice-covered highway a mile south of Rochester, Mich., directly in front of the interurban train. One daughter jumped from the machine and was uninjured. These facts were ascertained since the publication of the item about Mr. Ives in the issue of last week.

Mr. Ives had been connected with the Detroit United Railway for twenty-six years. He had worked up to his position of assistant general superintendent from carhouse boy. He was promoted to the office of assistant division superintendent and superintendent, and before his last position was assistant schedule chief and later second assistant general superintendent.

Mr. Ives has been popular with the company and with city officials. The city hoped to keep him when the Municipal Railway and the Detroit United lines were combined.

John A. Hurley, retired manufacturer of Bridgeport, Conn., died at his home in that city March 20. Mr. Hurley was born in New Haven, April 30, 1854. When young he removed to Meriden, Conn., where he became vice-president of the Connecticut Breweries Company. While in Meriden he built the electric railway from that city to Lake Compounce, known as the Meriden, Southington & Lake Compounce Street Railway. Mr. Hurley was later associated with the Hurwood Manufacturing Company, and more recently was engaged in the insurance business.

Walter G. Oakman, noted financier and railroad builder, died on March 18 in New York, N. Y. He was in his seventy-seventh year. Mr. Oakman was best known to New Yorkers as president of the Hudson Companies, which financed the tunnel system that links New York City with New Jersey. He had also been interested in the Interborough and the Brooklyn Rapid Transit companies. He was graduated from the University of Pennsylvania in 1864, leaving college to join the Union armies and fight in the closing months of the Civil War. Later he entered the railway field, and became division superintendent of the Delaware, Lackawanna & Western Railroad. He was a director of the Brooklyn Rapid Transit Company, Brooklyn Heights Railroad, Hudson & Manhattan Railroad, New York Municipal Railway and many other transit and banking companies.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

Industrial Machinery Division Formed

The Bureau of Foreign & Domestic Commerce, Washington, D. C., announces the formation of an Industrial Machinery Division to provide American manufacturers of machinery with assistance from the government. A pamphlet has been issued describing the functions and aims of the division, together with the service which is available.

William J. Clark Honored

William J. Clark, pioneer in the commercial development of electric railways in the United States and a member of the staff of the General Electric Company for thirty-four years, has been appointed advisory manager of the E. railway department. During his connection with the company, he has been manager of both its railway and foreign departments, managing director of the British Thomson-Houston Electric Company, manager of the Cincinnati office and manager of the London office of the General Electric, as well as holding other positions of importance. Mr. Clark, who was born in Derby, Penn., in 1854, was instrumental in obtaining the legislative charter authorizing the construction of the first electric railway in the world intended for freight traffic. This was at Derby and Ansonia, Conn. In 1888, he joined the Thomson-Houston Company, of Lynn, Mass., and induced that company to purchase the Van Depoele electric railway patents, which from a patent standpoint were essential to the fullest possible development of that industry. After he played an important part in the commercial exploitation of these patents as well as the series parallel control, Sprague's multiple-unit train control, Curtis' steam turbine and other inventions. In 1896, at Milwaukee, Mr. Clark made the first, in this country, of what is now termed "physical valuation" of a large electric public utility.

In 1908 he was expert on Cuban affairs for the War Department. In 1906 and 1907 he was the chairman of the ways and means committee of the National Civic Federation, in which connection he financed the extensive investigation of municipal ownership conducted by the federation in this country and in Europe; and he was a member of the commission which made the investigation. He was also connected with the Republican national committee in the years 1880, 1884, 1896, 1904.

Mr. Clark is a member of all the important electrical and railway engineering societies in the country. He makes his headquarters at the New York office of the General Electric Company.



WILLIAM J. CLARK

The duties of his new position, as indicated by the title, will be entirely advisory.

Foreign Trade Convention in Philadelphia

Ways of developing foreign markets for American goods are the concrete problems to be discussed at the Ninth National Foreign Trade Convention in Philadelphia, May 10, 11 and 12, when the best business brains and experience of the nation will concentrate on these questions.

The federal government will be represented through the Department of Commerce. Whether Secretary Hoover will be present is uncertain, but the Department will have a large number of its best executives and experts at the convention. Many of these will come direct from their posts abroad and thus will be able to give up-to-the-minute and first-hand information on foreign trade matters.

The big problem before the convention is how to sell abroad the estimated 20 per cent surplus of American production over domestic consumption. One suggested means is the incorporation in all foreign loans hereafter negotiated in this country of a condition that all or a large part of the proceeds be spent here for American goods. Another means of financing foreign trade that will be stressed is the employment of the gold surplus in the United States.

One general session will be devoted to taxation and currency questions. Shipping matters will be taken up at another, and the tariff and exchange at a third.

How Boston Will Spend Her Four Million

As was mentioned in the March 4 issue of the ELECTRIC RAILWAY JOURNAL the Boston Elevated Railway's 1922 budget will amount to approximately \$4,000,000. The following details or the major items of expenditure from this budget are of interest:

For power station equipment.....	\$1,000,000
For shops at Everett and Forest Hills	1,000,000
For new cars	200,000
For improved signal system.....	100,000
For Lechmere Square terminal.....	50,000
For new lobby building at Malden	150,000
For tools, sprinkler systems and miscellaneous equipment	

ELECTRIC RAILWAY MATERIAL PRICES—MARCH 28, 1922

Metals—New York

Copper, electrolytic, cents per lb.....	12.75
Lead, cents per lb.....	4.75
Nickel, cents per lb.....	41.00
Zinc, cents per lb.....	4.99
Tin, Straits, cents per lb.....	29.125
Aluminum, 98 to 99 per cent, cents per lb.....	19.00
Babbitt metal, warehouse, cents per lb.: Best grade.....	32.00
Commercial.....	16.50

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads.....	\$4.57½
Somerset mine run, Boston.....	1.87
Pittsburgh mine run, Pittsburgh.....	1.85
Franklin, Ill., screenings, Chicago.....	2.00
Central, Ill., screenings, Chicago.....	1.87
Kansas Screenings, Kansas City.....	2.50

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton.....	\$40.00
Standard open hearth rails, gross ton.....	\$40.00
Railroad spikes, drive, Pittsburgh base, cents per lb.....	2.05
Tie plates (flat type), cents per lb.....	1.75
Angle bars, cents per lb.....	2.40
Rail bolts and nuts, Pittsburgh base, cents, lb.....	3.87½
Steel bars, cents per lb.....	1.45
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.....	1.35

Hardware—Pittsburgh

Wire nails, cents per lb.....	2.40
Sheet iron, (24 gage), cents per lb.....	3.72½
Sheet iron, galvanized, (24 gage), cents per lb.....	4.42½
Galvanized barbed wire, cents per lb.....	3.05
Galvanized wire, ordinary, cents per lb.....	2.75

Waste—New York

Waste, wool, cents per lb.....	13.00
Waste, cotton, (100 lb. bale), cents per lb.: White.....	10.00
Colored.....	9.00

Paints, Putty and Glass—New York

Linseed oil, (5 bbl. lots), cents per gal.....	87.00
White lead, (100 lb. keg), cents per lb.....	12.25
Turpentine, (bbl. lots), cents per gal.....	87.00
Car window glass, (single strength), first three brackets, A quality, discount*.....	85.5%
Car window glass, (single strength), first three brackets, B quality, discount*.....	86.5%
Car window glass, (double strength, all sizes, A quality), discount*.....	85.0%
Putty, 5 lb. tins, cents per lb.....	5.50

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.....	14.12½
Rubber-covered wire, cents per lb.....	5.90
Weatherproof wire base, cents per lb.....	15.50

Paving Materials

Paving stone, granite, 4 x 8 x 4, f.o.b. Chicago, dressed, per sq.yd.....	\$3.35
Common, per sq.yd.....	3.00
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.....	2.17
Paving brick, 3½ x 8½ x 4, N. Y. per 1,000 in carload lots.....	49.50
Crushed stone, 2-in., carload lots, N. Y., per cu.yd.....	1.75
Cement, Chicago consumers net prices, without bags.....	1.94
Gravel, 2-in., cu.yd., N. Y.....	1.75
Sand, cu.yd., N. Y.....	1.00

Old Metals—New York

Heavy copper, cents per lb.....	9.37½
Light copper, cents per lb.....	8.37½
Heavy brass, cents per lb.....	5.25
Zinc, old scrap, cents per lb.....	2.37½
Yellow brass, cents per lb (heavy).....	5.25
Lead, heavy, cents per lb.....	3.81
Steel car axles, Chicago, net ton.....	\$13.25
Old car wheels, Chicago, gross ton.....	16.50
Rails (short), Chicago, gross ton.....	13.75
Rails (relaying), Chicago, gross ton.....	13.75
Machine turnings, Chicago, net ton.....	5.25

Coal Prices Decrease on Eve of Strike

The eve of the coal strike has been marked by a further softening of the market. Commercial consumers of coal have turned a deaf ear to the quotations made, while railroads and public utilities, which have been the most active takers, are going out of the market as their stocking programs are completed.

Heavy production in the face of this apathetic demand make lower prices inevitable. Coal Age index of spot bituminous prices stands at 170 on March 27, as compared with 173 on March 20. Domestic demand has almost disappeared and only the diminishing output of the resultant sizes kept steam prices from slipping to lower levels in sections where bituminous is used for household purposes.

The industrial consumer had several motives for withdrawing, temporarily at least, from the market. Present consumption rates are so low that reserve stocks are almost topheavy; indications that an announcement of cuts in freight rates will soon be made and the persistent belief that non-union fields will be able to supply fuel needs above existing stocks are the main reasons. No one wants to be caught after the strike with a stock of coal on hand that cost more than its replacement value. That the non-union supply may be adequate is being shown by the increasing desire of those operators to take on forward commitments, and dull times are surely ahead for the coal man unless the present suspension is sufficiently prolonged to enable consumers to work off the reserve supplies.

Westinghouse Electric Company Announces Personnel Changes

Several changes in personnel have been announced by the Westinghouse Electric & Manufacturing Company, among them being transfers of various managers in district offices.

R. L. Rathbone, branch manager of the Cleveland office, will take up special duties in connection with merchandising matters, with headquarters in Cleveland. J. Andrews, Jr., manager of the industrial division, Pittsburgh office, has been appointed manager of the Cleveland office and C. D. Taylor succeeds Mr. Andrews in the Pittsburgh office. R. Seybold has been appointed manager of price statistics and he will act as secretary of the domestic sales committee, among other duties, and will assist W. S. Rugg, assistant to the vice-president in general duties connected with the vice-president's office. W. R. Keagy has been appointed office manager of the Cincinnati office and J. R. Deering office manager of the Los Angeles office. H. S. Walker succeeds M. E. Lanning as promotion man in the Denver office and I. G. Cline takes up the promotion work vacated by R. A. O'Reilly in the Chicago office. K. L. Graham succeeds to the post vacated by H. C. Hopkins as promotion man in the San Francisco office.

Track and Roadway

Portland & Oregon City Railway, Portland, Ore., will extend its line 9 miles from Carver, Clackamas County, to Viola on Clear Creek. Proposed work will cost \$90,000.

New York State Railways, Rochester Lines, is planning to reconstruct about 5 miles of single track in Rochester during 1922. This will require new rails, track and pavement.

Fresno (Cal.) Traction Company has under consideration improvements and extensions of its lines requiring a total estimated outlay of \$150,000. Plans have not been revealed.

The Public Service Railway, Newark, N. J., is installing pilot lights on all single-track lines with turnouts on its southern division where one-man cars are operated. This gives the operator the advantage of being able to look straight ahead.

San Francisco-Oakland Terminal Railways, Oakland, Cal., has announced that it will begin work immediately on the double tracking on Fourteenth Avenue between East Twenty-first and East Twenty-second Streets. A switch will be installed to improve service on the Hopkins Street lines. The double tracking will cost approximately \$8,500.

Washington Railway & Electric Company, Washington, D. C., expects to extend its Eleventh Street and Lincoln Park lines. The company, according to present plans, will build the Eleventh Street line from the terminal at Eleventh Avenue and Monroe Streets, N. W., to Spring Road, out Kansas Avenue, and connect with the Georgia Avenue line. Overhead trolley construction will be used. The total cost will approximate \$107,940. The Lincoln Park extension will include work on East Capitol Street and will cost about \$97,250.

Power Houses, Shops and Buildings

Athens Railway & Electric Company, Athens, Ga., will purchase within a few days two 200-amp, 2,300-volt, single-phase regulators of the induction type, self-contained.

Boston (Mass.) Elevated Railway has asked for bids on two underfeed stokers and clinker grinders and the erecting of these under two 1825-hp. B. & W. boilers at the South Boston power station.

Cumberland County Power & Light Company, Portland, Me., has started work on its new \$1,000,000 power plant at Knightville. When completed the plant will add 10,000 kw. to company's facilities. The Foundation Company of New York has charge of the construction work.

Rochester and Syracuse Railroad has bought one automatic control equipment for the Macedon substation. This sta-

tion has two 400-kw. rotary converters, and a change-over switch provides so that either converter can be thrown on the automatic control equipment as desired. The hand control equipment to be removed from the Macedon substation will be used at two other locations.

Professional Note

Union Investment & Contracting Company announces the opening of offices at 7 Dey Street, New York, and the continuance of its business in association with the T. A. Gillespie Company, contractors, and with the Wood Hulse Yates Company, Inc., engineers. The company is prepared to execute for clients investigations, reports and appraisals and to undertake the design, construction, financing and management of industrial and public utility enterprises and other engineering projects. The officers of the company are T. A. Gillespie, chairman of board; F. A. Yates, president; B. F. Wood, vice-president; W. S. Hulse, vice-president; T. H. Gillespie, vice-president and treasurer, and F. J. Nash, secretary.

Trade Notes

Service Motor Truck Company, Wabash, Ind., will supply the Greater Winnipeg Water District Railroad with eleven motor rail buses, at a cost of \$176,000.

Irvington Varnish & Insulator Company, Irvington, N. J., announces a change in the ownership of the common stock of the company and the election of a new board of directors, consisting of William F. Hoffmann, Arthur E. Jones, Andrew Young, Carl Egner and D. Frederick Burnett.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has received orders from the Commonwealth Edison Company, Chicago, for three 12,000-amp., 60-cycle booster converters with transformer equipment, and one 16,000-amp., 25-cycle booster converter also with transformer equipment. The company also reports an order from the Consolidated Gas, Electric Light & Power Company of Baltimore, Md., for one 16,000-amp., 25-cycle booster converter with transformer equipment.

New Advertising Literature

The Truscon Laboratories, Detroit, Mich., have just issued a second edition of a thirty-two page booklet entitled "Science and Practice of Integral Waterproofing." The first fifteen pages are devoted to explaining why concrete requires waterproofing, and following this are specifications for various methods recommended. There is also a chapter devoted to the practical application of waterproofed cement plaster coat. This publication is being distributed free to those interested.

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to 70 tons



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**A Special Type—A Right Type
for Each Size and Type of Car**

From the Peacock Staffless—a development of recent times for the little safety car—to the Peacock Improved 12/52 type for heaviest interurban and rapid transit cars, there is a Peacock Brake to fit your particular requirements. We have been developing and manufacturing hand-brakes for so many years that we can deliver what's needed in any case.

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Peacock Staffless



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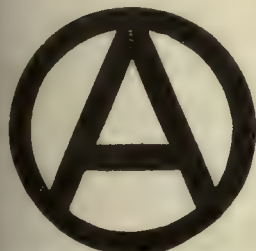
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Street Railway Inspection
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Every Week

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.



FARE COLLECTING ON A CORRECT BUSINESS BASIS

A one-man car equipped with an Ohmer Fare Register with a capacity of twelve different fare classifications.

By the use of Ohmer Fare Registers the principles of successful merchandising are applied to the electric railway business.

The amount of each transportation sale is publicly indicated and a printed record made of it. The passenger is given the satisfaction of a visible receipt for exactly what he pays.

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Ohmer Fare Register Company
Dayton, Ohio



A convenient installation for a one-man car or motor bus.



*"P & H" Guaranteed
Penetration Process
Makes Poles
Cost Less
In the Long Run*

You buy more than Butt-Treatment when you specify the *"P & H" Guaranteed Penetration Process*; you buy longer pole life.

The years of added life secured through this process of Butt-Treatment cuts your pole cost to an absolute minimum.

Demand the original *guaranteed* penetration process—Specify the *"P & H."*

WE produce and sell treated and untreated Northern White and Western Red Cedar Poles;—we can give you any form of Butt-Treatment;—and we are the originators of the *Guaranteed Penetration Process*—the *"P & H."*

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On every mile of track
with wood ties

And they have repeatedly demonstrated a saving of \$2,000 per mile over wood tie construction in gravel ballast.

Dayton Resilient Ties (1) reduce first cost; (2) give longer life to track; (3) reduce track and paving repairs; (4) reduce upkeep of rolling stock and (5) reduce traffic noise.

Have the facts about lower cost track construction laid before you—write today!

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The time for track building and track re-
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No doubt you would have attended to several
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using concrete foundation, or a saving of
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Is it any wonder that more and more electric
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manent low-cost construction made possible
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This tremendous saving in hard-earned
dollars is sufficient argument for any

straight-thinking business man. Conservation
must come, not by tightening our belts, so
to speak, but by instituting better and more
modern methods of construction at lower costs.

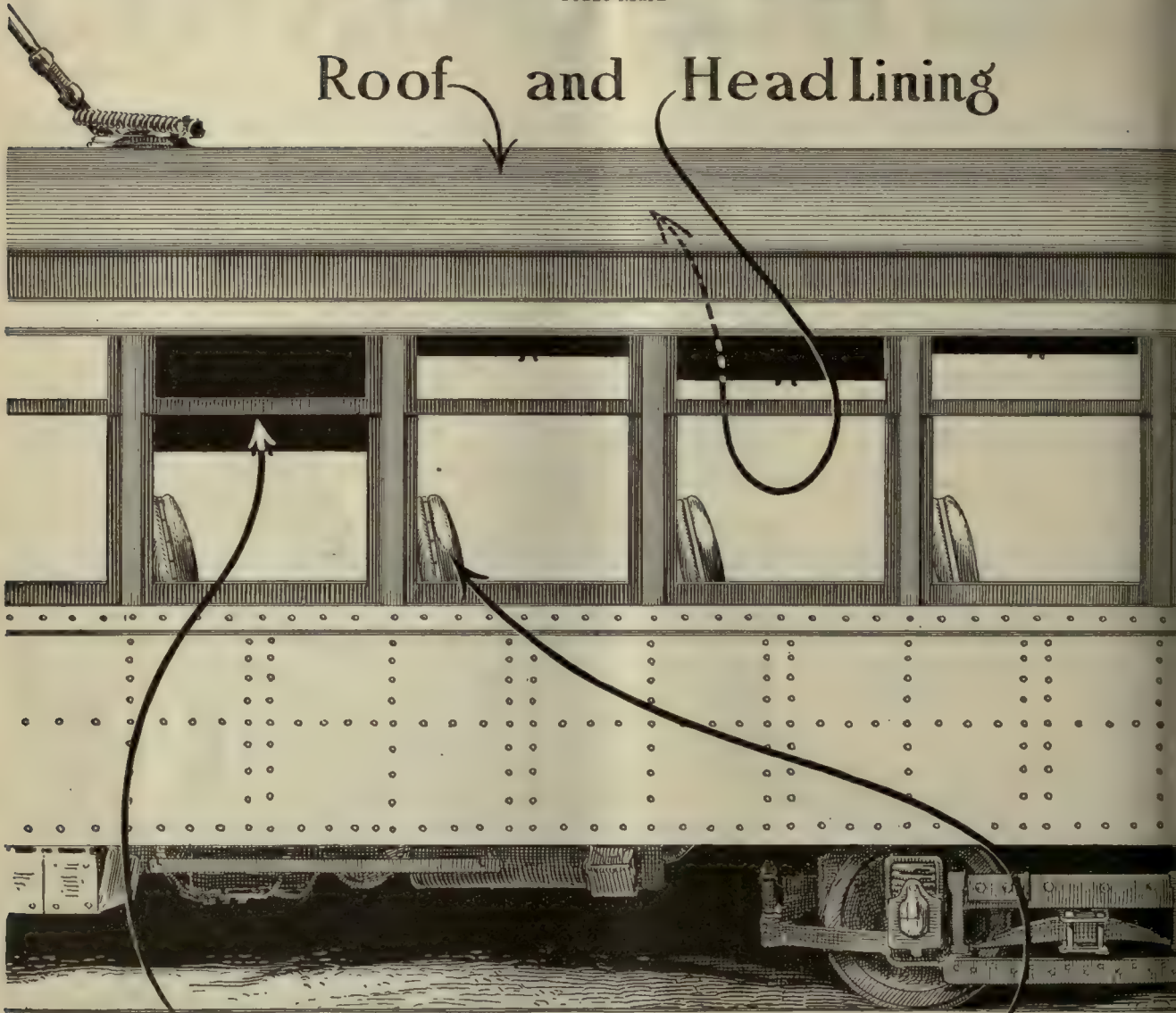
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Gear
Dotted line shows tooth-form
14½° involute. Solid line shows
tooth-form of Nuttall Helicals.

Pinion
Dotted line shows tooth-form
14½° involute. Solid line shows
tooth-form of Nuttall Helicals.



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From an inspection of the 12 Safety Gears installed last fall we find the six helical equipments show absolutely no indication of wear at the bearing flanges or on the axle collar while the six spur gear equipments are badly worn.

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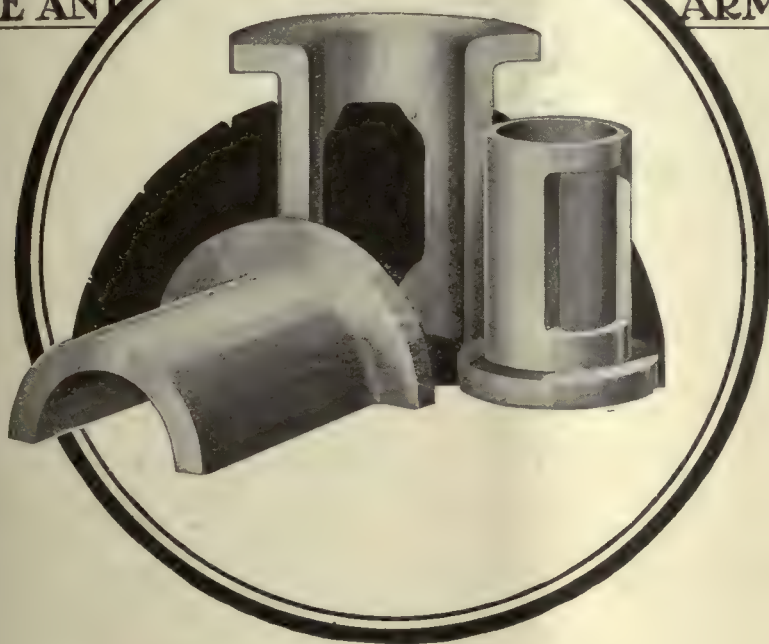
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The difference in the actual cost of Tiger Bronze Axle and Armature Bearings and "others," if any, is *small*.

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It simply proves that when you sacrifice quality for price in first cost you pay in ultimate cost and ultimate cost is the only true measure of economy.

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This is made possible by our rigid inspection at every stage of operation, our careful manufacturing methods and extensive study of modern electric operating problems.

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THE map above shows the location of the 49 foundries in the United States and Canada, represented by the Association of Manufacturers of Chilled Car Wheels.

- | | |
|-------------------|--------------------|
| Chicago, 3 | Sayre, Pa. |
| St. Louis, 2 | Berwick, Pa. |
| Buffalo, 4 | Albany |
| Pittsburgh, 2 | Toronto |
| Cleveland, 2 | New Glasgow, N. S. |
| Amherst, N. S. | Madison, Ill. |
| Montreal | Huntington, W. Va. |
| Mich. City, Ind. | Wilmington, Del. |
| Louisville | Houston, Tex. |
| Mt. Vernon, Ill. | Hannibal, Mo. |
| Ft. Wayne, Ind. | Reading, Pa. |
| Birmingham | Baltimore |
| Atlanta | Richmond, Va. |
| Savannah | Ft. William, Ont. |
| Boston | St. Thomas |
| Detroit | Hamilton |
| St. Paul | Ramapo, N. Y. |
| Kansas City, Kan. | Marshall, Tex. |
| Denver | Los Angeles |
| Tacoma | Council Bluffs |
| Rochester, N. Y. | |

American Railroad Association Standards

- | | |
|-------------------|-----------------------|
| 650 lb. wheel for | 60,000 Capacity Cars |
| 700 lb. wheel for | 80,000 Capacity Cars |
| 750 lb. wheel for | 100,000 Capacity Cars |
| 850 lb. wheel for | 140,000 Capacity Cars |

The Standard Wheel for Seventy-One Years

ASSOCIATION OF MANUFACTURERS
OF CHILLED CAR WHEELS
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CHILLED IRON WHEELS

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LONG time service as well as accurate and reliable registration is the result of the rugged construction of International registers. The test of long service on many street railways throughout the country has proved the quality of design and construction in these registers. Of the 1000 type R-7 International Registers sold the Chicago City Railways in 1901, nearly all are still in service. Many of the early International registers used on the Philadelphia system, which were installed in 1900, are still in service.

International Fare Registers are made in models and sizes adapted to meet the registration needs of a variety of collection methods. All parts are interchangeable and needed repairs can be easily made.

Exclusive selling agents for
HEEREN ENAMEL BADGES.

The International Register Co.
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Type R-5



Type R-10

The Standard Register Equipment of a Majority of Electric Railway City Systems.



*Two men easily handle 48-inch diameter
"ACME" (Nestable) Culvert*

*Large diameters,
—so easy to handle*

**"ACME" (NESTABLE)
CORRUGATED METAL CULVERTS**

Full circle culverts are hard to handle, especially the large diameters. Take 48-inch diameter. Even a 10-foot length requires a gang to handle it. And—the longer the culvert, the harder the handling.

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Speed and Safety

will result from the constant use of Bayonet Equipment. Renewals made instantly.

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are made from the highest grade metal and are hand turned, insuring greatest accuracy and balance. Reputation was gained by competitive tests.

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are the only trolley harps with which you can change from wheel to sleet cutter or to a new wheel in ten seconds. No tools required on top of the car. Inspections, repairs, adjustments and lubricating done at work bench later on when no schedules are being held up.

Bayonet Trolley Base with Detachable Pole Clamp

is the only trolley clamp made on which the trolley pole can be changed in 30 seconds and the wheel be in perfect alignment with the wire. No tools are required to do this job. It prevents schedules being delayed. A uniform wire pressure at all angles of the pole is obtained, thus saving on your overhead, wheel and wire.

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have no superiors when it comes to cutting ice from the wire. Both rigid and semi-rotary types furnished.



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The appearance of a Bates pole line is a public asset

Of all the property of a public utility corporation, the pole lines come most before the eye of the public—the public whose good will is vital from every point of view.

The trim, smart appearance of Bates poles remains with age. They are symmetrical, obviously sturdy and yet unobtrusive. The company whose pole equipment comes from Bates "Best" stock, "Best" by test, has made a practical investment from the standpoint of public policy as well as financial policy.

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Let us tell you the sound facts and engineering data which have made this remarkable pole pre-eminent in its field.

There is a reason why Bates pole users save money and build good will.

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Serves the men responsible for results wherever any kind of machinery is made or used. The recognized clearing house of the better ways of doing things in the machine shop, of the new ideas in machinery and of the most approved methods in shop management. \$5.00 per year.

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Presents the latest authoritative information on the activities of the central station, the industrial electrical engineer and on the scientific, manu-

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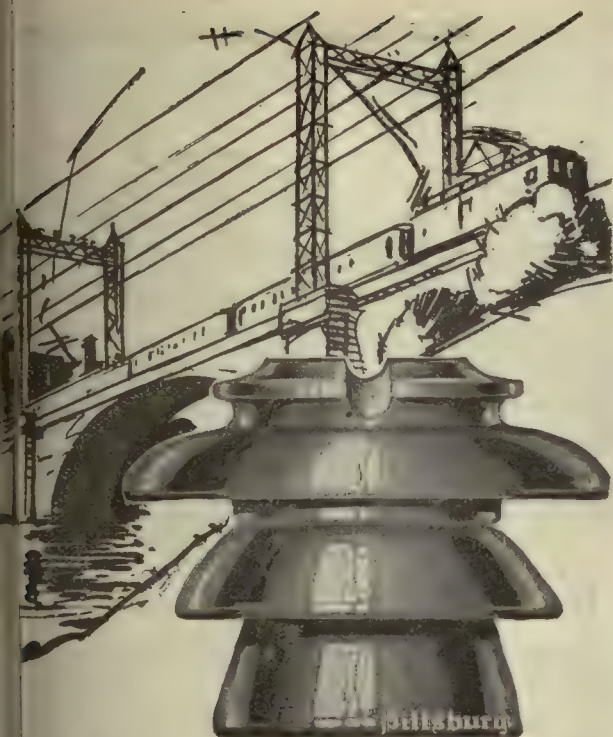
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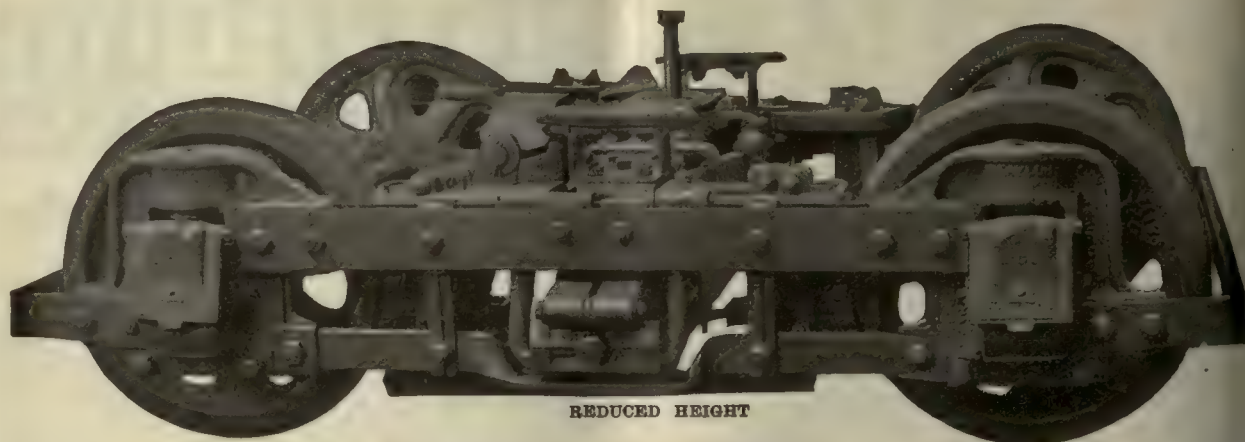
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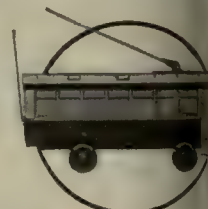
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How the big Power Co's do it

This is a
DOSSERT
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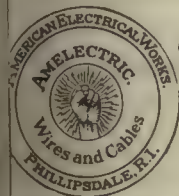
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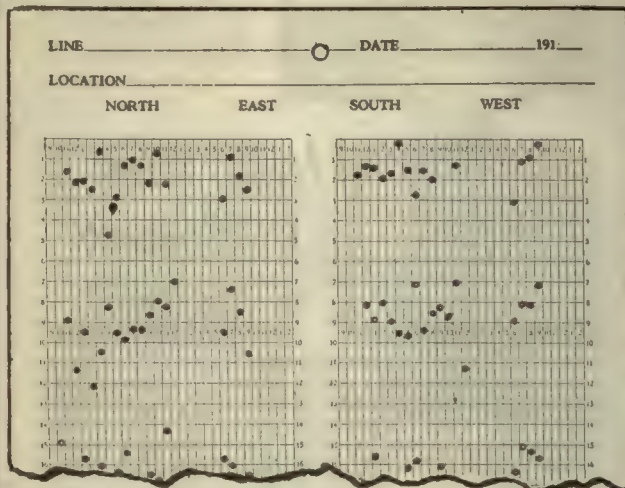
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By means of it, conductor or motorman
can change sign without leaving platform.
All that has to be done is to turn the
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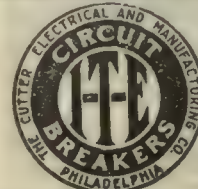
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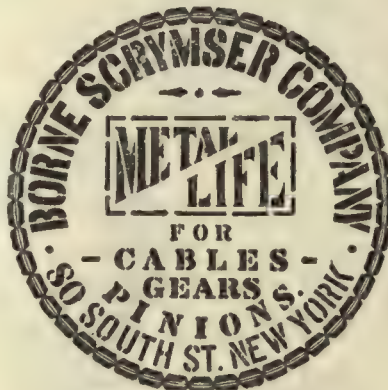
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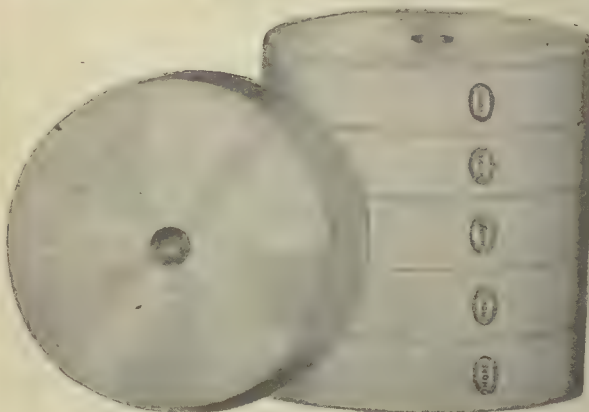
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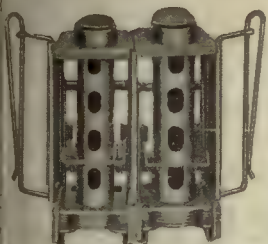
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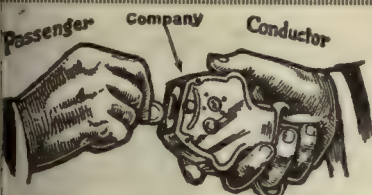
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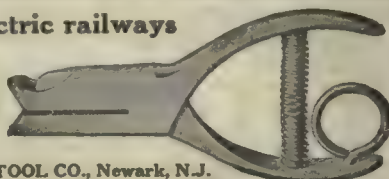
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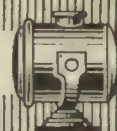
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Equipment, Apparatus and Supplies Used by the Electric Railway Industry with
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- Advertising, Street Car**
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Co.
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Westinghouse Tr. Br. Co.
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National Carbon Co.
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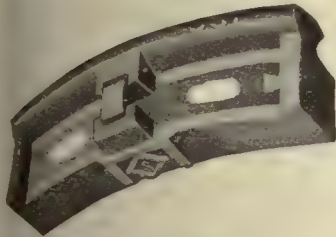
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U. S. Electric Signal Co.
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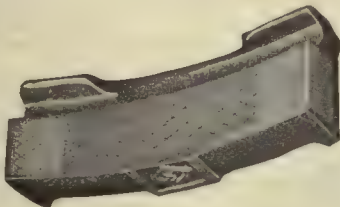
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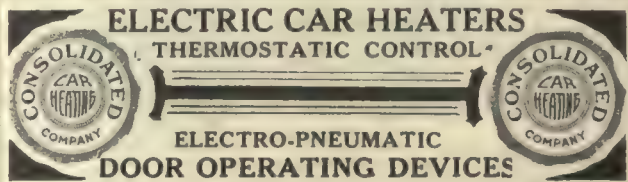
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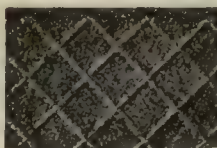
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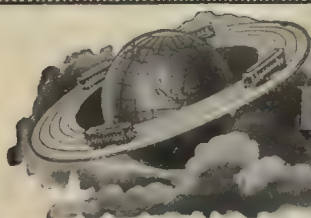


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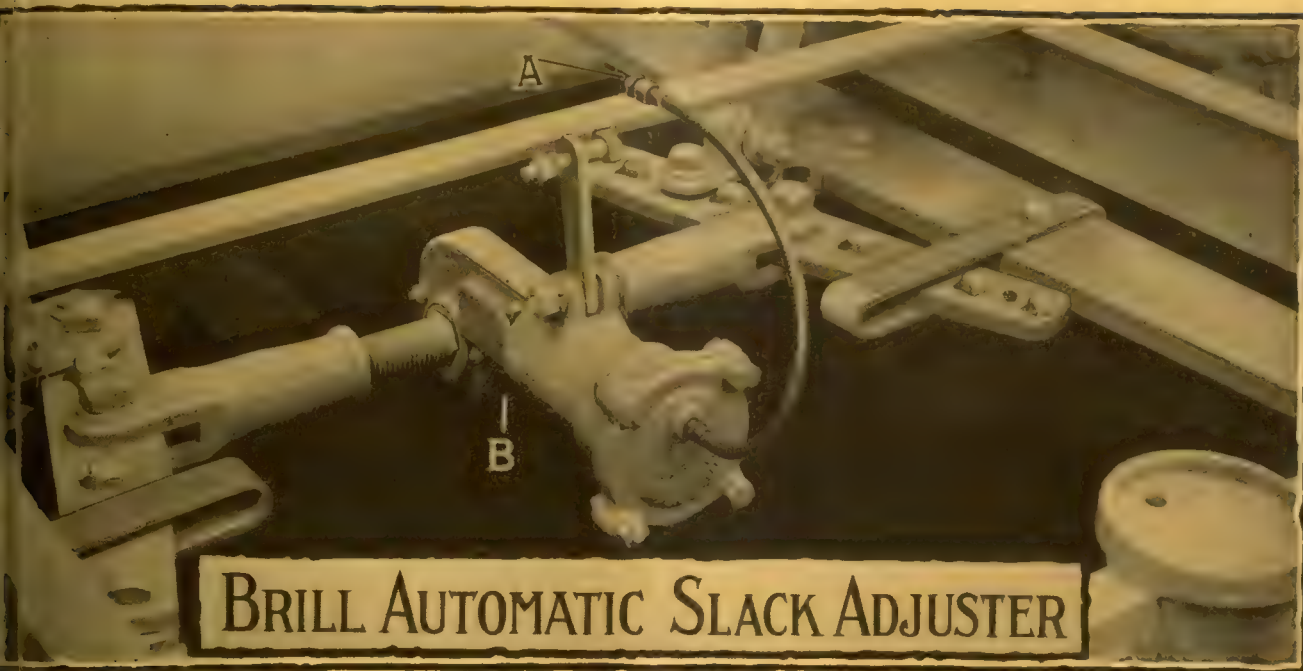
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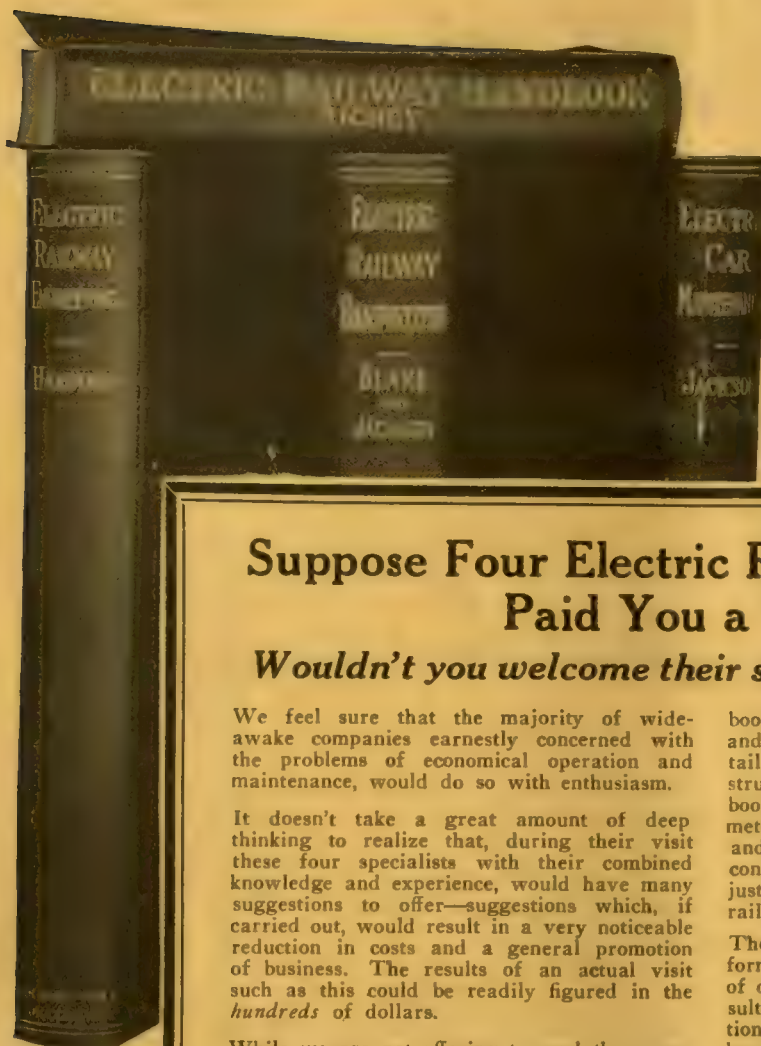


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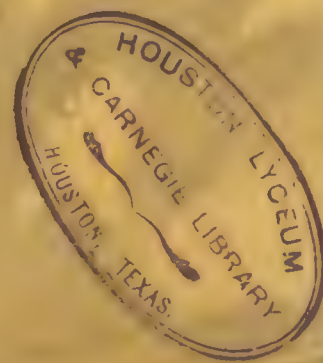
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At quite frequent intervals in the columns of this paper articles on manufacturers' tests and inspection of railway material have been printed. In these an attempt has been made to demonstrate the great care that is exercised by them to insure the maintenance of a high standard of quality. The manufacturer is just as vitally interested in having his materials give good service as is the operator. He realizes that one of the essentials of sound business is to give satisfactory service, and this can only be accomplished if the highest grade of material enters into his product. To offset this fact, at the present time, without doubt, materials are subjected to more severe conditions than ordinarily. In fact the severity of electric railway operating conditions is continually increasing. The present conditions of heavy overload and deferred equipment and track maintenance add one more element of stress to the equipment parts.

There is one point that should not be lost sight of, however, namely, that the scrap heap is an excellent place to study weaknesses of material, and the equipment of electric railways at the present time is certainly in a condition to afford valuable data. The battle-scarred motors, axles, pinions, gears and truck frames will afford suggestions for improving the situation.

Every economy counts and if a better grade of steel, a better lubricant or method of lubrication, a better method for installing and maintaining gearing can be developed by the manufacturer in co-operation with the railway shops, then every encouragement should be given to research work of this character.

Editorial from March 11, 1922 issue of Electric Railway Journal

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Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors

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THIS week sixty service men, wearing in their coat lapels the button shown above, are meeting at the home of the ELECTRIC RAILWAY JOURNAL. They have come to their home office from the shores of the Pacific and the Gulf, from the plains and from the mountains, from New York and from the nameless mining camp. An aggregate of more than 50,000 miles they will have traveled before they return to their appointed tasks as McGraw-Hill field men.

These men, our pioneers and scouts, our eyes and ears, travel constantly to help us to be useful to you. Their mission it is to carry the message of McGraw-Hill service to industry to the men who can profit by our publishing activities. It is through them that many of our readers are first brought into the family of more than 180,000 subscribers to the McGraw-Hill publications, and the keynote of their meeting, therefore, is of direct interest to you.

An officer of our organization, addressing this gathering, voiced the point that concerns you. "You men," said he, "are representatives not only of our publications. You represent also our 180,000 subscribers. If you enroll a subscriber who cannot benefit by what you sell him, you serve neither him nor us. If you do not serve him you do not serve us. You are the very cornerstone of our business. I envy you your opportunity to learn by direct contact with our readers how we can be increasingly useful."

Service to industry, the foundation of our work, is also the slogan of these McGraw-Hill field men. Whether they call on you to discuss subscriptions, to learn from you some news of the industry, to sense your needs or just to see if there is anything that you would like us to do for you, remember that they are your representatives as well as ours and that back of each of them stand all the energies, contacts and resources of the McGraw-Hill organization—for your use.

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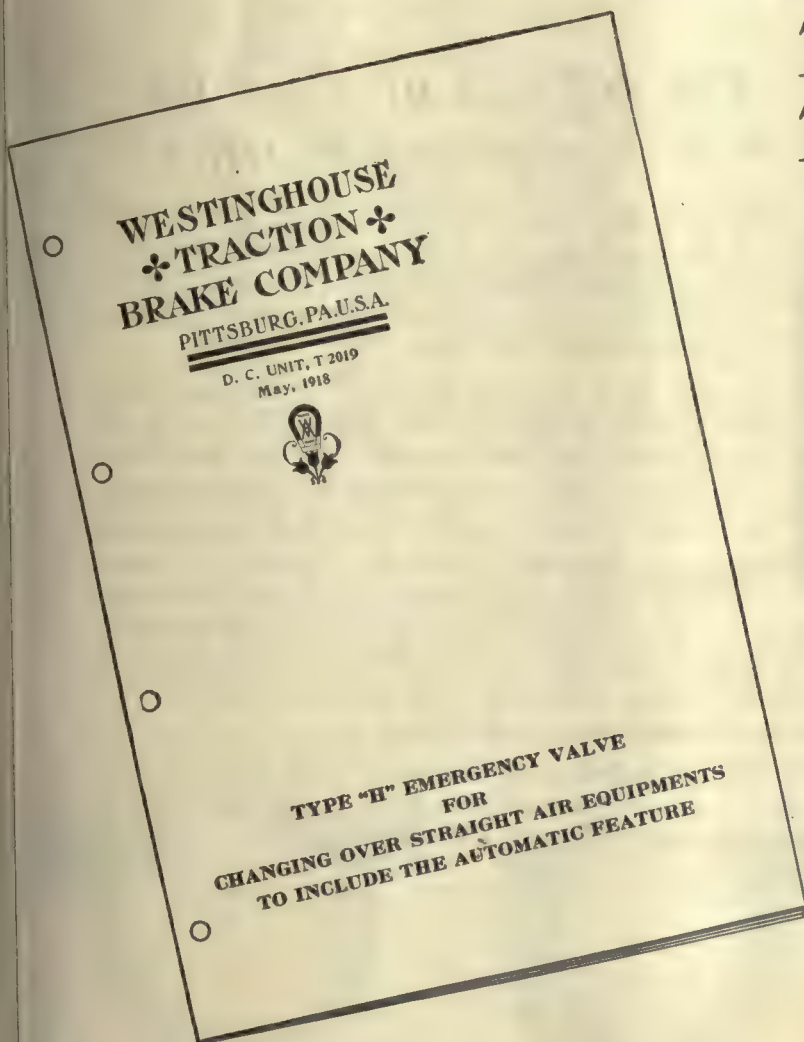
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If cars couldn't operate past an unbonded or poorly bonded joint, you'd be money ahead

Would it seem expensive to have a car stalled and idle until the bounding crew could get to the job? That would be cheaper in the end than the way it works out now:

Every poorly bonded joint adds its percentage to power costs.

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To keep costs down and service up you need good bonds.

O-B Bonds are good bonds.

You are paying more for poor bonding than good bonding costs.
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Type AW-3 Bond for Ball of Rail
Also made for Base of Rail.

O-B Arc Weld Bonds have four fundamental features which simplify installation and make a better weld possible.

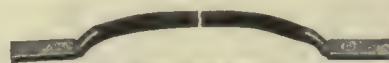


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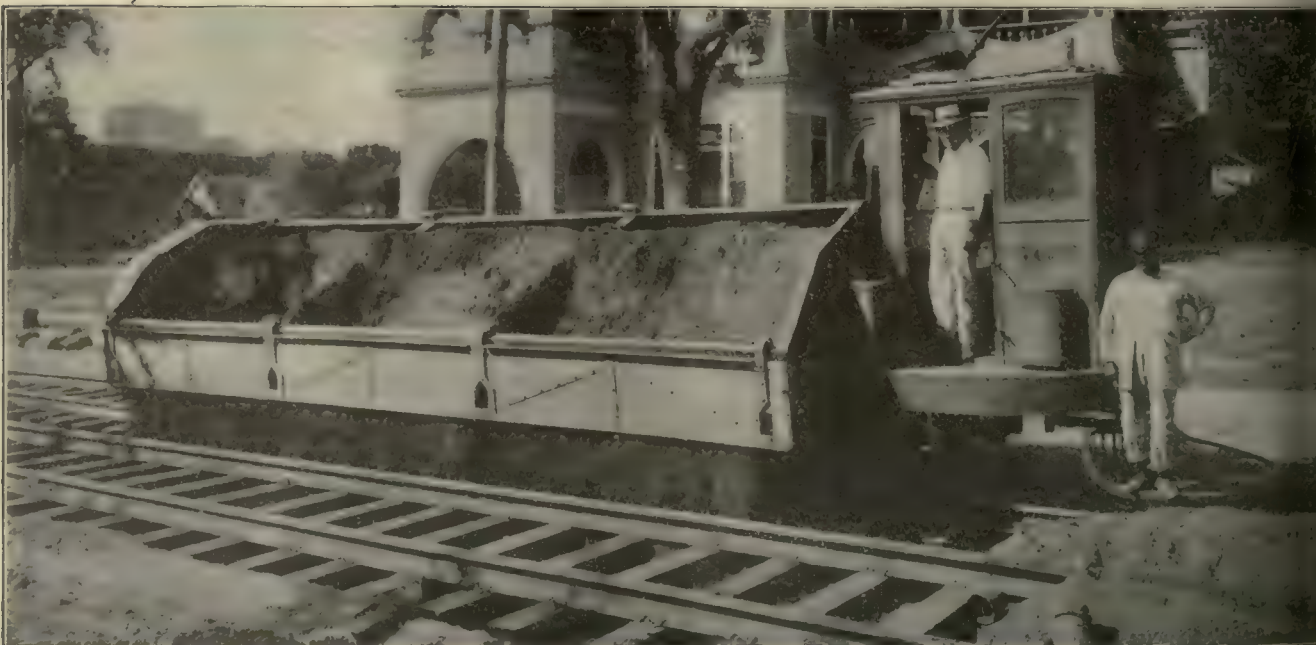
1922—2 *Differential Cars*

The Dallas Railway Company was aware of the saving to be effected by Differential Car operation when they bought their first car in 1919.

The anticipated savings were more than achieved. And now to carry out their construction and maintenance program they buy two more cars. Doesn't the significance of this and all those other Differential repeat orders strike you as impressive? The user is the best judge of economies. Dallas Railway Company's experience in actual money saved can be duplicated in your own case. Any Differential car user will tell you.

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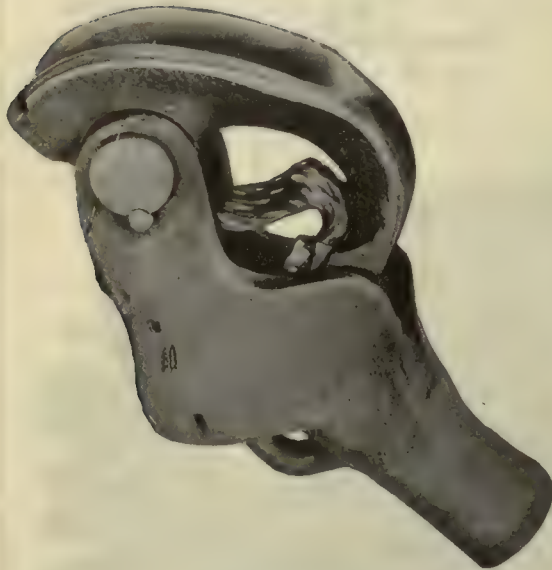
—In Steel Twin Tie construction, the tie structure embedded in concrete is not

For estimating get the 1922 prices at your delivery point.

THE INTERNATIONAL STEEL TIE CO., CLEVELAND

Steel Twin Tie Track

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Have You Ever Examined a Miller Shoe?

or have you just glanced at the pictures and passed on. Don't you think the advantages we have been claiming for it, the economies other roads have actually found on it, are worthy of a little more earnest consideration?

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The Miller Trolley Shoe Company
Boston 21, Mass.

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RECIPROCATING Track Grinder

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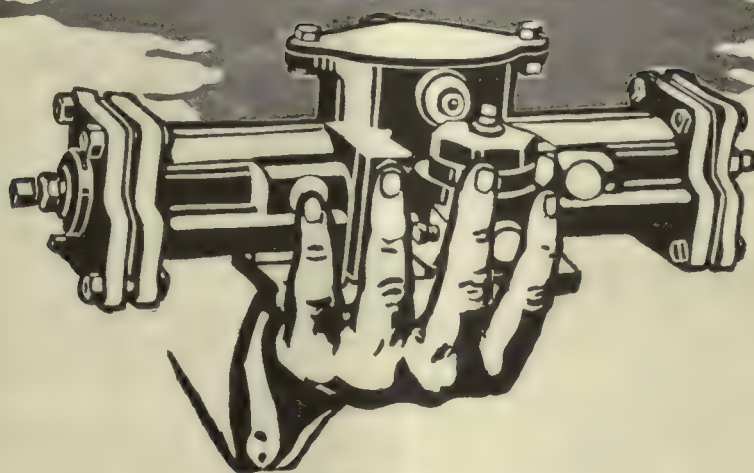
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"Creosoting is conceded to be the most effective of all treating processes" (Camp)

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Some of them are very important.

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Texaco Summer Electric Car Oil.
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COLUMBIA MACHINE WORKS

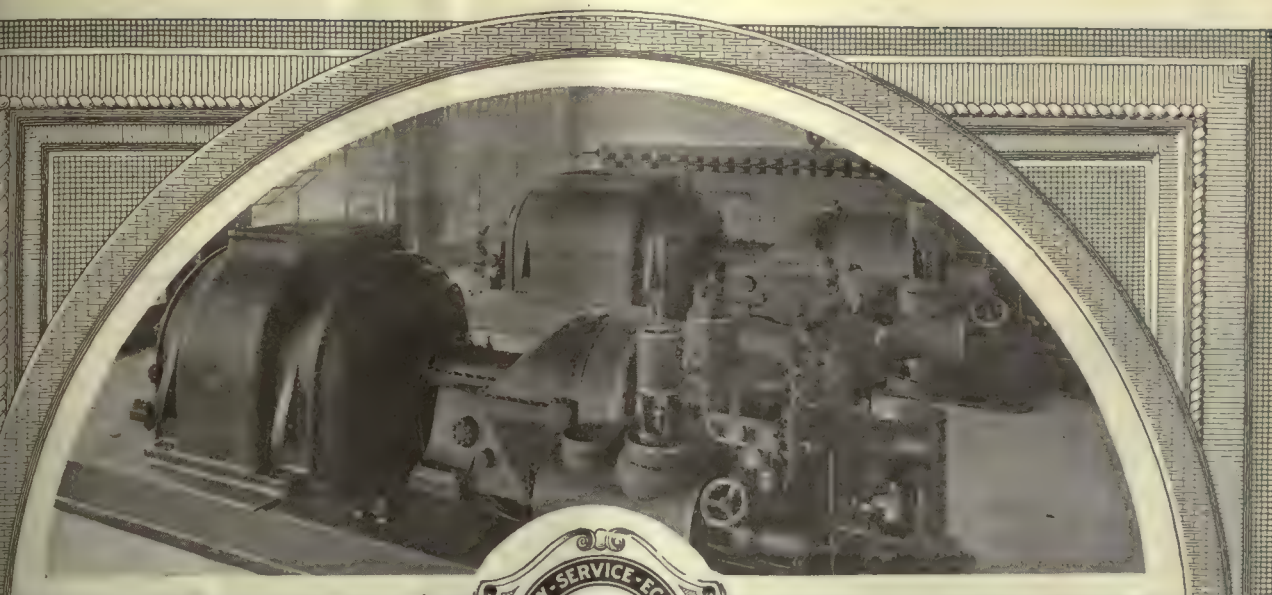
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Galena Turbine Oils — light, medium, heavy — and Galena White Turbine Oil must, from the crude to the finished state, conform with Galena Quality specifications. Suitability for the work required is the first consideration.

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Galena-Signal Oil Company

New York

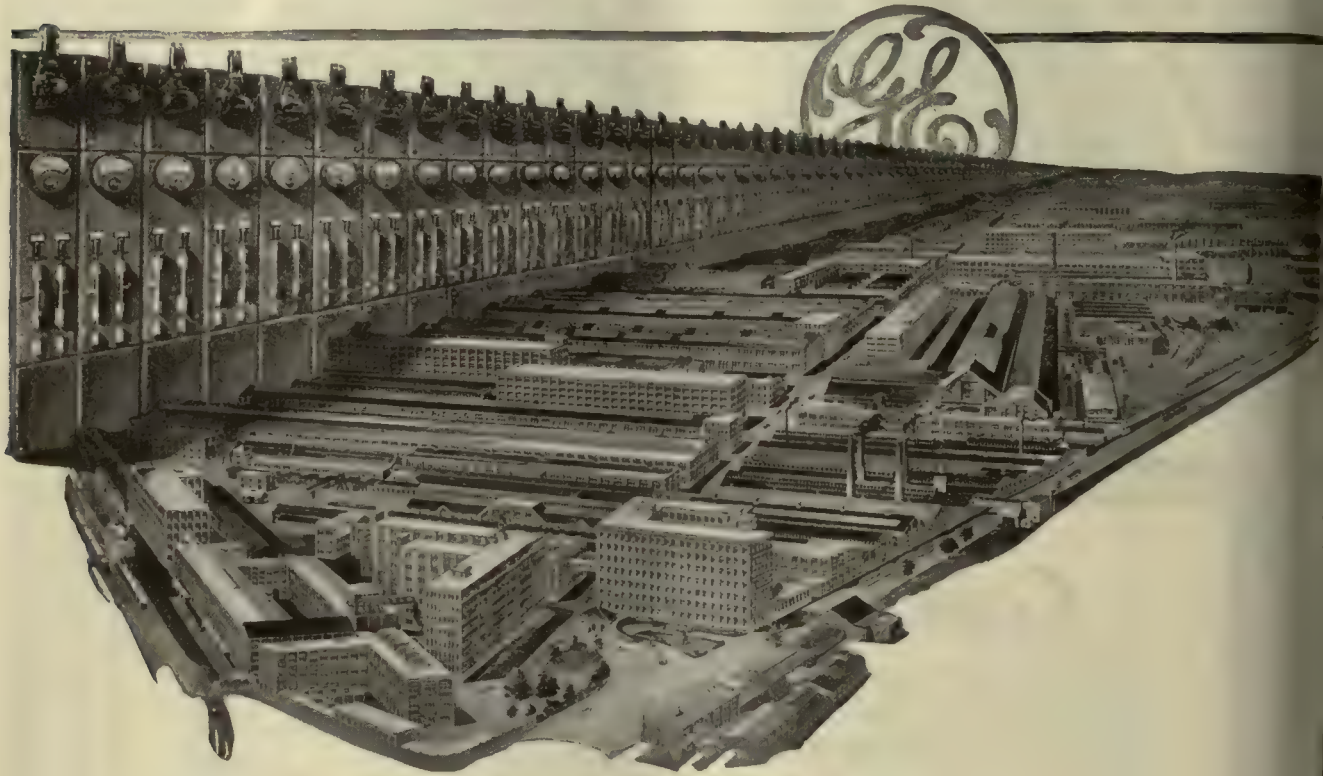
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Specialist in your vicinity.*

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Volume 59

New York, Saturday, April 8, 1922

Number 14

Million Dollar Idea

ANTOINETTE FUNK presented an idea at the Mid-year Dinner that is worth a million to the industry. In connection with her "Bond in Every Home" slogan, she suggested that a special appeal be made to the women in selling the stocks of the companies on the customer ownership plan. The women are usually the regal members of the family. They know how to accumulate a substantial bank account (possibly kept in the "first national bank") through the process of building it up by small additions. Most every wife has a little tucked away somewhere on which she is getting only 3 per cent or no interest at all. How strong would be the appeal to her, then, to find she could just as well be receiving 6, 7 or 8 per cent on her savings with safety. Undoubtedly there have already been many women among the purchasers of utilities securities. These have responded to the general sales activities and advertising. But it is believed that by putting forth a sales campaign primarily directed to the women, companies would find this a source of adding many names to the list of stockholders and securing many thousands of dollars for expansion of the business. Mrs. Funk presented the industry with a real financial idea.

Better Selling Will Help the Railways

REFLECTIONS of increased buying and of renewed activity in physical property maintenance were mentioned last week as appearing in increasing numbers in the columns of this paper. The editors are not anticipating any large amount of new mileage, but this is not an essential to a good year for those serving the field. With finances now permitting, a very substantial betterment program is under way and it is certain to amount up to considerable business because of the deferred work that must be taken care of and because the present competitive era is forcing the replacement of old equipment with new, modern, more economical units and the addition of more facilities, in order to improve service. It is becoming realized with increasing force that with modern equipment and plenty of it so that the service provided can be first class, the electric railways have nothing to fear from competition.

But better selling means not only getting business for the firm. The salesmen owe it to the railways as well as to their firms to make certain that executives have all the information about new and better equipment. Railwaymen are not the kind who seek out the salesman and urge him to take their money. They have to be sold and sold hard, perhaps several times over. They take certain pride in being hard to convince and, with many problems pressing, they are willing to get rid of a salesman quickly if he "dies" easy. What is needed is some real selling, a reconsecration to good, hard, persistent, intelligent work on the part of the salesmen. For, sad to

say, not all railway executives, either, are alert to the new service demands that are upon them, and some good, strong selling may rouse them to their responsibilities and save the day for them as well as the salesmen. Let's have less of salesmen playing with salesmen and more of salesmen working (and playing) with railway men.

Every One Would Lose if the Lease Was Broken

THE present deadlock in the New York transit situation is one which peculiarly calls for a give-and-take attitude on the part of all parties concerned. It has arisen through the Manhattan lease which was executed in 1903 and, unless changed, is to continue until 1974. By its terms the Interborough agreed to pay taxes and all interest on the Manhattan Company's bonds as well as 7 per cent on its outstanding stock and \$35,000 annually for organization expenses.

As drafted, the lease was intended to be made as strong as possible, and declares "no reduction of the guaranteed annual dividend rental or in the term of years shall be made without the unanimous consent of the shareholders of record of the lessor"—the Manhattan Company. In other words, the lease is practically a lease to the Interborough by each individual stockholder of his proportion of the property of the company and not a lease by the company as a whole.

Obviously, it is going to be very difficult to get the consent of every stockholder. Hence, the simplest legal way of vacating the lease would seem to be for the Interborough to go into the hands of a receiver and let the receiver void the contract. But this would also be a very serious matter for all concerned; that is to say, not only for the Interborough security holders, particularly the stockholders, but also for the New York Transit Commission, the community at large and the security holders of the Manhattan Railway.

Receiverships are notoriously expensive, so that such action would not be welcomed by the Interborough security holders. The commission would find legal delays acting as a brake to the progress of its unification plan, which it hopes to get finished this summer, and it would have still another large company to bring into line. The public would not only find the present chaotic conditions longer continued, but it might lose the use of some of the extensions built by the Interborough Company for the Manhattan Company, except at an additional fare. Finally, it is hard to see how the Manhattan Company could profit by such a change. It might gain some property or the right to buy that property at a low price from the receiver of the Interborough, and under its original franchise it might be more free to charge a higher fare than at present. On the other hand, besides losing its guarantee, it would have to build up an operating organization, and its operating expenses would naturally be much more than at present. From a transportation and engineering

standpoint, the subway and elevated systems logically should be operated by the same company.

The situation, therefore, presents the rather unusual aspect of one in which each of the four principal parties to it have considerable to lose and nothing to gain by a receivership. In these circumstances it would seem as if they ought to get together. The duty of doing so is directly up to each so far as each can help.

A Catalyser Is Badly Needed

IN HIS address to the New England Street Railway Club last week E. Mark Sullivan, corporation counsel of Boston, said that the public is generous and is, eventually, right in its opinion or judgment. He also made some complimentary remarks about the management of the Boston Elevated, thus admitting that public utility managements have a speck of generosity, human understanding and ability to work with the public. But what E. Mark did not point out is that frequently one side or both need speeding up in that action which tends ultimately to complete and sympathetic understanding so that "service" may go forward. Too often the conditions are such as to demand a catalytic agent. For example, New York and Chicago.

A catalyser—for those who may have mislaid their chemistries—is a third chemical or agent which, when present with two other chemicals, hastens the chemical action which would eventually take place between the two, though not being a party to the actual affair itself.

In the issue of March 11, in the Publicity Department, there was an example of a catalyser at work. "Verily I Say Unto Thee," by the Little Rock minister, shows one way to expedite the formation of that "eventual" generous and correct public opinion. There are others. The public and the utility managements are, in every community, developing an understanding. But if the public good is to be served, expedition of that understanding is necessary.

To take a text from the Corporation Counsel of Boston and a sermon from a Little Rock minister and apply the result to Chicago and New York may seem far fetched. But the idea appeals as a good one. Surely a good, strong catalyser is necessary in the latter city if not in both.

Deferring Maintenance Expenditure Is Not Saving Money

DURING the past few years transportation companies have kept down operating expenses by all means within their power. They simply had to do it. One result was to enforce economies and efficiency in a manner that would have been impossible in more prosperous times. This is a real gain, for the habits of thrift formed under adverse circumstances will persist even after times become easier. But along with the more economical operation has gone a paring down of maintenance expenditure which is not economical; on the contrary, it is extravagance, for it is impairing the value of the properties.

Some of the well-known steam roads are conspicuous for the way in which valuable physical property is being allowed to run down through the régime of "economy" which is now the rule. These roads are conspicuous because they are so large, but many smaller steam

roads and many electric roads are following the same procedure. It is easier to reduce operating expenses in this way than any other, hence the popularity of the method. The results, however, will prove most unfortunate in the long run because deterioration in one part of a property reacts on all other parts. And it is difficult to convince the public of the improving quality of service when the same public sees the instruments that service becoming less effective from month to month.

Retrenchment in maintenance expenditure may have been necessary, drastic retrenchment in some cases. In extreme cases some properties may have to depreciate further. But the fact that the property is running down should be faced frankly. The procedure is not saving money, in spite of a possible presumption that extra wear can be had surreptitiously, so to speak from track, overhead, power plant or rolling stock without any resulting ill effects. Maintenance, if considered over a period of years, is much like the respiration or blood circulation in the human body—cessation spells dissolution.

More Reasons Why Railways Should Be Relieved of Paving Costs

MUCH has been said about the injustice of making an electric railway pay for the maintenance of the paving which is around its tracks but which it does not use simply because the horse railway, of which it is the successor, used to wear out the paving. Not as much has been said about the different character of paving required and its greater cost now as compared with the kind which the horse railways used to lay between their tracks forty years ago. Nevertheless, this imposition about as serious an injustice on the railway as does the fact that a pavement at all has to be maintained. The point is brought out very clearly in a paper presented recently before a real estate association in San Francisco by W. V. Hill, manager California Electric Railway Association, and published elsewhere in this issue.

From another standpoint also the old requirement of the electric railway to bear the cost of a considerable portion of the paving has become obsolete in some sections of the country.

There are many communities in which the method of paying for pavement improvements has changed. Whereas in early days all street paving was paid for by the city, now the abutting property owners pay for the paving. Under the former method, still in force in many cities, the benefit from the railway's paying part of the paving extended to every taxpayer because it reduced the tax levy of the city. But under the latter method, where the paving is paid for entirely by the property owners, and there is no participation by the city, it is no longer a provision for the benefit of the entire community. Instead of being a provision in the interest of all taxpayers it has changed into a discrimination in favor of that limited number of taxpayers who own property along the line of the railway against the great mass who live off the line and are required to pay the entire paving cost in front of their property.

In addition, then, to the usual reasons for relief from paying tax, those railways in communities where paving is paid for by abutting property owners have a forceful argument for mitigation of their burden which they should be sure to capitalize upon.

Track and Wiring on Large Bridge

The Connecticut Company Has Recently Completed Interesting Track and Overhead Construction on the New "Washington" Bridge, Spanning the Housatonic River Near Stratford—A Number of Novel Features Are Introduced



THE OVERHEAD WIRE AND TRACK CONSTRUCTION ON THIS NEW BRIDGE ACROSS THE HOUSATONIC RIVER HAS JUST BEEN COMPLETED BY THE CONNECTICUT COMPANY

DURING the seventeenth and eighteenth centuries travelers on the Boston Post Road between Bridgeport and New Haven had to use a ferry across the Housatonic River, which at the point where the Post Road crosses the river is about half a mile wide. By the beginning of the nineteenth century, however, the authorities decided a bridge was necessary, and one was built in 1802. Unlike most bridges of that time, it was an uncovered structure, very low, and during perigee or other unusual high tides it was frequently under water. In 1806 there was a big ice flow on the river and the bridge went out into Long Island Sound with the ice.

At that time a popular way by which the authorities provided funds for needed public improvements was to conduct a lottery. The plan was followed to raise the funds in this case, and with the money thus obtained a new bridge was built about 1808. After sixty years of service, this bridge collapsed in July, 1868. In 1892 a new bridge, the third in the series, was again necessary, and it was erected at a cost of \$88,500. This bridge served until the new Washington bridge was ready in November, 1921.

In 1897 the Milford Street Railway received permission to cross the bridge, although it was not wide. The original bridge was made narrow, it is said, through political influence because the steam railroad interests feared trolley competition. There was even no footpath on the bridge until twenty years after it was built.

It was thought in 1892 that the bridge then built was heavy enough to stand the strain of highway travel for years to come, but the traffic on this main highway route between New York and New England has been so increasingly heavy during these twenty years that even as early as 1913 there was much agitation in favor of a new bridge.

Work on the new bridge was started in March, 1920. As will be noticed in the engraving at the beginning of this article, it is much higher above the water line than the old one. While this height accommodated the rise in the bank on the east side of the river, it necessitated

an enormous amount of fill on the west approach. A few general facts in regard to the bridge will be given before the account of the track and trolley construction on it.

The draw is of the bascule type. The counter weights each weigh 583 tons and are so adjusted with reference to the weight of the lifts that two men can open either side of the bridge. Two 37-hp. induction motors are used, one for each lift, but only 20-hp. is necessary to do the work. In the two lifts a total of 813 tons of steel was used; 32 tons of this amount comprises the weight of the two trunnions. All the machinery used in the operation of the lifts would balance a 200,000-lb. weight. For the operation of the bridge, the main cable, pier lamps, roadway lamps, etc., more than 5 miles of wire had to be used.

From the point of junction of the old and new trolley routes on the Stratford side to the Milford side the old distance was 2,706 ft. The new route is 56 ft. shorter, or 2,650 ft. On the old layout the distance from the change in track location on the Stratford side to the center of the bridge is 1,150 ft.; the corresponding distance on the new layout is 1,300 ft. On the old trolley line there were 820 ft. of double track on the Stratford approach up to the bridge, then 666 ft. of single track across the bridge and 1,220 ft. of double track on the Milford approach. The new layout is double track throughout, and it eliminates the only break in double track between Bridgeport and Milford.

On the new bridge the track on the west approach consists of 771 ft., while that on the east approach is 1,014 ft. in length. The length of track on the concrete part of the bridge is 865 ft., 183 ft. of which is on the lifts.

The bridge was built under the direction of engineers of the State of Connecticut, so that in their work of constructing track across this bridge the Connecticut Company engineers had to adapt their work so as not to interfere with the bridge construction.

As the feeders approach the bridge, the first change in construction takes place with the connection of the

overhead construction to the underground feeders on the approach itself. Dossert "T" connectors were used to attach overhead feeders to the feeders that ran down the laterals. From the laterals the feeders were run directly through a manhole without splicing and carried along under one sidewalk up as far as the lift itself.

There were six cables thus strung up to the main pier of the bridge, after having been snaked through underneath the sidewalk. This was necessary because the sidewalk was laid before the work was begun. This made the task a very tedious one because there was a space of only 11 in. between the sidewalk and the concrete stringers. Cleats of wood saturated with carbolinum were placed on each stringer to support cables.

Four of these six cables are made up of 750,000 circ.mil flexible stranded rubber-covered copper wire, one No. 6 rubber-covered copper cable for signal purposes and one No. 0000 copper wire, which was used to carry current merely to neutralize the stray currents which were influencing the Amer-

6 ft. in the mud outside of the dolphin. The distance from the switch box to a similar box on the other side of the bridge is 435 ft.

In the same trench with the feeders are four 750,000 circ.mil cables for the return circuit, connecting the four rails on the two sides of the bridge. These four cables are connected together at each end by a copper bus bar to protect against the failure of any one cable. Through a knife switch on the trunnion of each lift, a common connection is made from the four cables connecting the rails on the standing part of the bridge to a bond connecting the four rails on the bascule lift.

SETTING OF POLES WAS DIFFICULT

Considerable difficulty was encountered in the setting of the poles on the approaches since all the ground on the approaches was fill and not firm. To make the poles

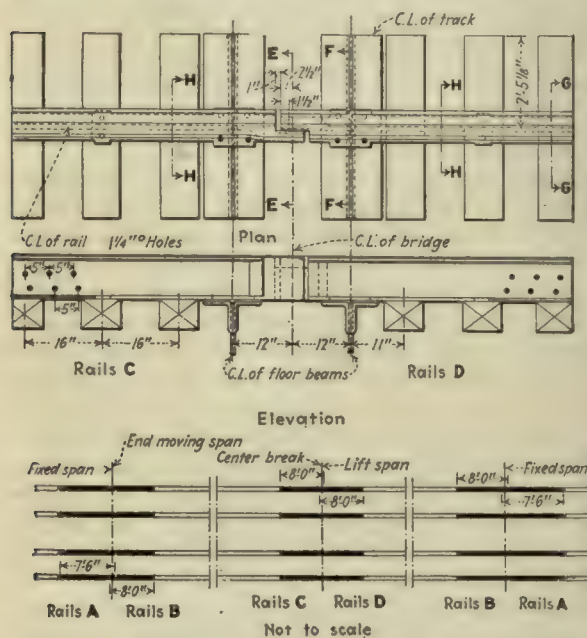
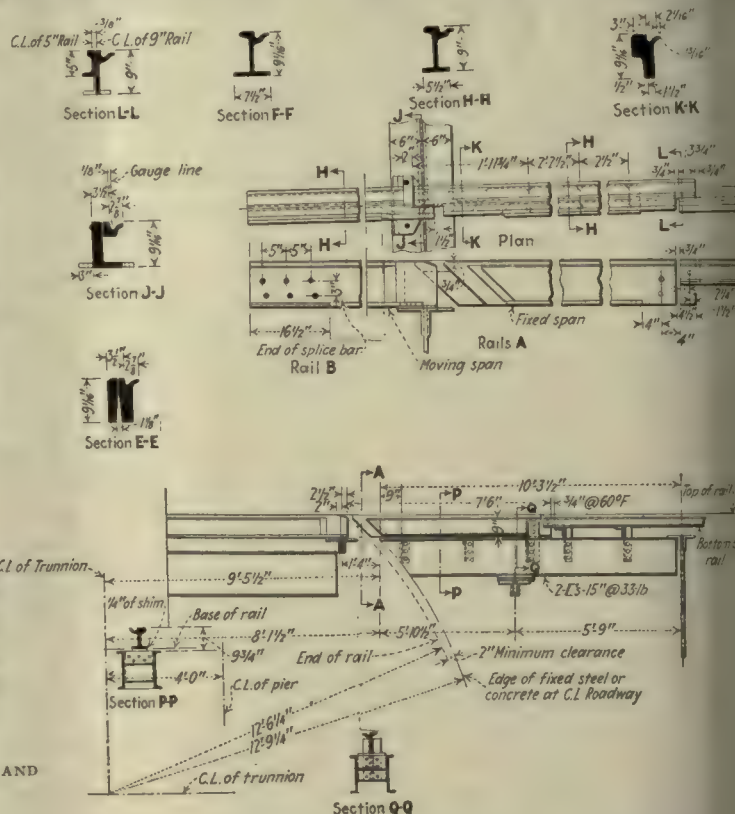


DIAGRAM SHOWING DETAILS OF TRACK CONSTRUCTION AND MANGANESE RUN-OFF RAILS ON LIFT AND FIXED SPAN OF BRIDGE

ican Telephone & Telegraph Company's lines. When they reached the lift the feeders had to be changed from rubber-covered into armor-clad submarine cables, so that they could be carried under water to reach the other side of the channel.

To do this, the feeders were connected to the submarine cables through a switch box employing 1,000-amp. switches for the main cables and a 500-amp. switch for the signal cable. Two spare 1,000-amp. switches were connected with two spare submarine cables in case some misfortune should cut one of the cables already in use. Before reaching this switch box the signal and four feeders were connected through Westinghouse m. p. lightning arresters. These arresters were connected through a common ground wire to a 1½-in. iron pipe, 18 ft. in length. This pipe was driven into the ground inside of the dolphin, and the No. 0000 copper wire from the arresters was welded to a cap on the top of the pipe.

Leaving the switch box, the submarine cables were cleated to the abutment at dead low tide to resist any possible strain from ice, and then were laid in a trench



so that they would not give and allow the wire to slacken, very large holes were dug in the side of the fill, in some cases to a diameter of 16 ft., and boarded to prevent slide. The poles were then set 16 ft. in the ground with cement around their base 6 ft. in depth and 3 ft. in diameter. Fifteen poles were set in this way. Fifty-five chestnut poles were set altogether, and they were afterward graded to the specifications of the bridge engineers. To secure these poles further, they were back-anchored to rails 6 ft. long, which were sunk in the fill and concreted in. Guy wires were then attached. Pole derricks had to be used in setting the wooden poles.

On the bridge itself 3-ton solid reinforced concrete poles with square bottoms were used. These poles were made complete upon the ground and were raised and set in holes about 4 ft. deep. While these poles were being made, a short section of galvanized iron pipe was set in the pole at the proper height for the overhead span wire. A bronze ¾-in. x 18-in. eyebolt was later passed through this pipe in the pole to hold the span



APPROACH TO BRIDGE WITH TRACK AND OVERHEAD IN COMPLETED CONDITION



THE ENTRANCE TO LIFT CLOSED AND TRACKS OPEN FOR OPERATION

we. These poles were modeled after the type used on the Eighth Street Bridge by the Lehigh Valley Transit Company in Allentown, Pa.

Seven-strand $\frac{1}{8}$ -in. copper weld span wire, which is practically free from corrosion from salt water, is used for the overhead and on the bridge is attached to these bronze eyebolts.

CONSTRUCTION ON THE LIFT

On the bascule lift the overhead construction used is similar to that employed in similar installations by the Chicago Surface Lines. This system may be called the live trolley wire, which, in this case, is copper and No. 00 in size. Half of the overhead on each lift is rigid, the other half of the wire being kept taut when the bridge opens by a counterweight on a flexible guy wire which takes up the slack as the lift is raised. The wire is drawn back through an idler, which keeps the wire in position, the tension being supplied by a 1,050-lb. weight. The counterweight for each wire is contained within steel towers about 100 ft. from the lift. By a system of sheaves, the ratio of the movement of the wire to the drop of the weight is 3:1.

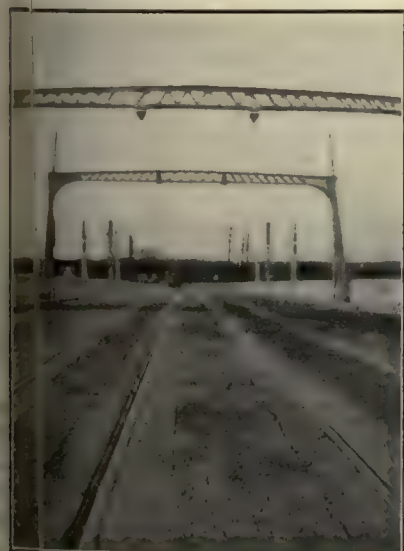
This overhead construction on the bridge was installed by the state and differs in some respects from the standards in such places of the Connecticut Com-

pany which call for a slack, dead wire. The Connecticut standard allows the wire to hang limp when the bridge is open to navigation, and a knife switch is located on the trunnion which makes and breaks the circuit when the lift is lowered or raised respectively.

TRACK CONSTRUCTION ON APPROACHES

The track construction on the approaches consists of 5-in. 80-lb. T-rail, laid on oak and chestnut ties 6 in. x 8 in. x 8 ft. in size. The ties are laid on 2-ft. centers, and the rails are spiked to the ties with $\frac{1}{8}$ -in. x 5 $\frac{1}{2}$ -in. cut spikes. Sixty-foot rails are used, the ends being joined together with continuous joint plates, 24 in. long. Each joint is bolted with two $\frac{3}{4}$ -in. x 4 $\frac{1}{2}$ -in. bolts. The joints are bonded with two 40-in. No. 0000 concealed bonds. The joint plates were electrically welded at the top to the rails by the Lincoln motor-generator process, 2 in. being left on each extreme end. Two oblong holes, 3 in. x 1 in. in size and about 9 in. on each side of the joint, were cut in the base flange of the joint plates, and the plates were welded to the base of the rail at these points.

The ties and track on approaches was laid on crushed stone and gravel ballast. The pavement is a 3-in. surface asphalt on a 6-in. concrete foundation. The concrete base was constructed so as to give a 5-in. depth



FINISHED TRACK CONSTRUCTION, SHOWING ASPHALT STRIP ALONG THE RAILS

under the base of the rail, this construction providing a concrete tie for a foundation in the event of the decay of the wood tie. Due to the fact that experience has shown the tendency of the asphalt to curl up and break away where it joins the rail, particular care was taken by the company's inspector to see that the asphalt was thoroughly rammed under the head of the rail, entirely filling up this space. It is expected that this will prevent dirt from working in between the joint of the asphalt and the rail and getting in under the asphalt, causing it to spawl off along the rail.

An additional preventive was taken to reduce trouble along the rail by sealing the joint between the asphalt and the rails with a squeegee coat of high test heated asphalt. This was followed with application of hot irons. Some of the views accompanying this article clearly show the results of this work. It will be noted that the seal coat takes in a strip about 8 in. wide along each rail, which is the area that the Connecticut Company is obliged to maintain under the paving law passed by the Connecticut Legislature early in 1921.

The track construction on the concrete portions of the bridge is the same as that on the earth approaches, except that the track is laid in a concrete trough with a ballast of crushed stone. The depth of ballast is about 4 in.

TRACK CONSTRUCTION ON LIFT SPAN

On the lift span, 9-in., 120-lb. Boston grooved rail, laid on 6-in. x 8-in. x 8-ft. creosoted yellow pine ties, was used. The rails are in 50-ft. lengths and twelve-hole bolted channel bars are used at the joints. The ties

are dapped $\frac{1}{2}$ in. over the 18-in. I-beams running longitudinally under each rail. The ties are fastened to the I-beam stringers with $\frac{3}{4}$ -in. x 5-in. lag screws. Each rail is fastened to each tie with two $\frac{1}{2}$ -in. x $5\frac{1}{2}$ -in. wedge pointed square spikes. To prevent creeping, the rails are



MITERED JOINT IN MANGANESE RUN-OFFS BETWEEN LIFT AND STATIONARY PORTION OF BRIDGE

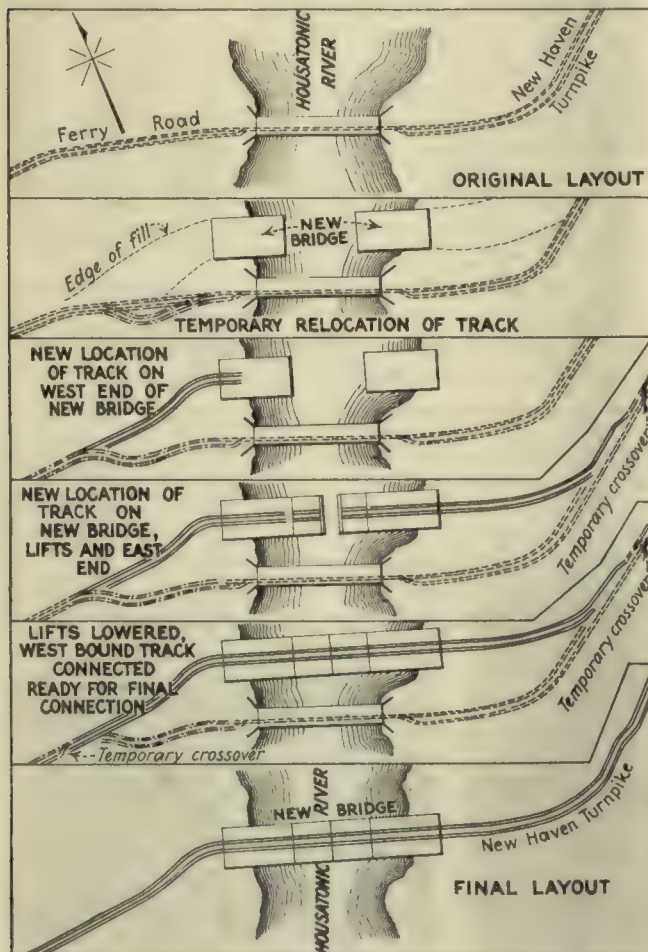
fastened at each end with $\frac{1}{2}$ -in. x $5\frac{1}{2}$ -in. lag screws, which pass through drilled holes in the base of the rail.

The rails adjoining the three breaks in the lift spans, one on either end and one in the center, consist of 8-ft. lengths of manganese steel. With double track and three breaks there are twenty-four of these pieces. The manganese steel sections are the same depth as the rail on the lift but they are of special form. A continuous tread bearing is furnished to the car wheels at these joints between rail steel and manganese steel by the use of square mitered joints, as can be seen in the attached sketch. This is the first use of mitered joints on trolley tracks in this section of the country. Manganese rails are used at these points to prevent pounding and wear.

The sections of manganese rail on the stationary parts of the bridge rail are mitred not only at the breaks, but also at their outer ends where they join with the 5-in., 80-lb. T-rail which is used on the bridge approaches. At this point considerable space is left to provide for expansion of the rails on the approaches. The compromise joint between the 9-in. manganese casting and the 5-in. rail is made by means of a stepped steel support in the stringers directly over the counterweight pit. Cross sections of all the special construction which was used in these manganese rails are shown in an accompanying drawing.

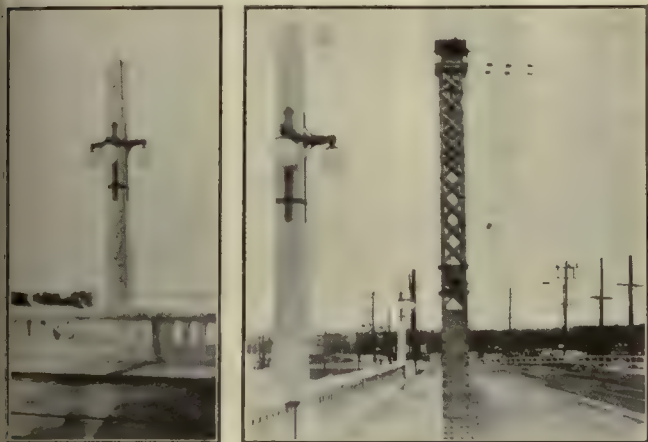
On the lift span the floor construction consists of 3-in. x 8-in. creosoted planks laid longitudinally with the rails and spiked to the ties with two 7-in. spikes. The sub-planking of 4-in. tongue and grooved creosoted yellow pine is laid at right angles to the rails. Each plank is fastened to each nailing strip with two 6-in. spikes. On this sub-planking are laid creosoted rectangular shape wood paving blocks, every seventh block being fastened to the sub-planking by means of a dowel pin.

Ample provision was made for taking care of surface water on the track area of the bridge. Catch basins were installed at the ends of the fixed spans of the bridge and two sets on each of the approaches to the bridge. On each approach of the bridge a pit of adequate size was provided to allow for direct removal of snow. Prior to the work of bridge construction, the



SKETCHES SHOWING DIFFERENT STAGES IN THE WORK OF CHANGING THE TRACK FROM THE OLD BRIDGE TO THE NEW BRIDGE

engineer representing the State Highway Department and the division engineer of the Connecticut Company planned each step in the method of construction of the new tracks and the removal of the old tracks to allow for the continuous operation of trolley traffic with the



AT LEFT, ORNAMENTAL CONCRETE POLE, AND AT RIGHT, LATTICE POLE WHICH SUPPORTS SPAN WIRE ON CONCRETE PORTION OF BRIDGE

maximum amount of track facilities without detriment or interference with construction of the bridge proper or the laying of the paving. The first step was to relocate a section of about 800 ft. of double track south about 100 ft. from the highway on to private land. The necessity for this relocation was to allow the State to complete a fill on the west approach to the bridge. It was necessary to obtain a lease of this land from three different parties and arrangements were made for its lease for the duration of the bridge work. The next step was to cut in a switch in the westbound track on the west approach to the bridge and build the new westbound track up to the lift span. As it was impossible to build across the lift span at this time, the second track on the west approach was then constructed. During the construction of these two tracks the ties and rails were laid on two lift spans. It was necessary to lay this track with the lift spans raised at an angle of 70 deg.

The next step was to cut in a switch on the east approach to the bridge, taking off from the westbound track. To do this, owing to a change in the grade of several feet, it was necessary to remove a section of the westbound track between the old bridge and the point where the switch was to be put in. This removal of the old track required the installation of a left hand portable crossover easterly of the point of switch to take care of car operation. It required also a transfer of the United States signal from the old end of the double track at the old bridge to the new temporary crossover. After this work the new westbound track was laid up to the lift span.

Following this, the new eastbound track was constructed. This track was laid from the lift span up to a point about 300 ft. from the point of junction with the old layout, and it was built easterly as far as possible without interfering with the old eastbound track, which at that time was carrying all of the car traffic. The pavement construction on both approaches followed closely behind the trackwork. The work on the lift span being completed, the westbound track was connected up at each end.

Temporary crossovers, a right hand on the east approach to the bridge and a left hand on the west

approach, were then installed to allow for car traffic being turned across the westbound track on the new bridge. This change in operation necessitated the transfer of the United States signal on the west approach to the bridge. Following this, operation was begun across one track on the new bridge and track forces were immediately put to work in tearing out the old tracks on each approach to allow for the completion of the connections of the new eastbound track. The tracks were then paved, after which the remainder of the old tracks was removed. All this new track construction and relocation of old track was accomplished without any interference to traffic.

The first track across the new bridge was opened jointly for car operation with vehicular traffic on Nov. 1, 1921. The bridge was entirely open for traffic on Nov. 11, 1921. The engineer for the Public Utilities Commission inspected the construction on Nov. 1, 1921.

Preparing for Electric Traction

AT EDINBURGH, Scotland, the street car system, which has long been operated by cable, has at last succumbed to progress of the times and is being electrified. The accompanying photographs are forwarded from Edinburgh as evidence of that fact. One of the photographs was taken in the armature winding shop of the Strubhill Depot, where formerly only cable car repairs were carried out. There is no doubt about what sort of equipment is being worked on here.



GRAPHIC PROOF THAT EDINBURGH TRAMWAYS ARE NOW BEING ELECTRIFIED

The other photograph shows an extension being built on the Leith carhouse to accommodate the new Edinburgh cars when the system has been electrified. The cost of the carhouse extension is £24,000.



WHERE THE CARHOUSE IS BEING EXTENDED TO CARE FOR THE NEW ELECTRIC EQUIPMENT

Examination for Foremen

Beaver Valley Traction Company Asks Answers to Sixty-seven Questions Relating to the System to Test Knowledge of Its Employees

GREAT interest was attracted last summer to the questionnaire of Mr. Edison, drafted to determine knowledge on general subjects possessed by applicants to employment with him. Last fall W. H. Boyce, general manager of the Beaver Valley Traction Company, decided it would be well to test the knowledge of the foremen, dispatchers and office employees on that property, not on general subjects but on matters applying directly to the operation of the line. In consequence, he prepared the sixty-seven questions given in the list below and submitted them for answer to the group mentioned. The results obtained were such as to stimulate an interest in the daily affairs of the company among this group. They suggest the desirability of other companies conducting similar examinations.

What is the total population served by the Beaver Valley Traction Company and the Pittsburgh & Beaver Street Railway Company?

How many miles of track do we have in the Beaver Valley Traction Company and the Pittsburgh & Beaver Street Railway Company?

Where is the division line between the two companies?

What is the total number of passenger car-miles operated per day on both systems?

What was the total gross revenue for both companies last year?

In your opinion how much less will our revenue be this year than last in both companies?

When does the last car leave Ambridge for Beaver?

At what time should a person leave East End Avenue, Beaver, to connect with car at Fifth Street, Beaver Falls, Harmony line?

What is the fare from Beaver Falls to Industry?

What is the fare from Rochester to Butler?

What is the fare from Ambridge to Morado?

Give average number of car stops which our cars make per car-mile operated.

In labor turnover, what is considered a fair percentage?

What is the average number of car failures per thousand car-miles?

Who built our center-entrance steel cars?

Who built our safety cars?

Is it compulsory that cars be equipped with jacks? If so, why?

In what boroughs do the companies' franchise ordinances regulate the interval between cars? What is the minimum interval required?

What is the value of all our materials carried in stock?

What is our yearly cost of stationery, printing and postage?

What is our total monthly payroll now?

If we desire to put into effect a new tariff, how many days' notice does the Public Service Commission of Pennsylvania require for (a) increase; (b) decrease?

By whom may a complaint be filed against a tariff?

If a complaint is filed, does the new rate go into effect before a hearing is held by the Public Service Commission of Pennsylvania?

How many square miles of street paving do these companies maintain?

What is the average distance a passenger rides?

What is the horsepower of the motors on safety cars?

What is the kilowatt consumption per car-mile for: safety cars, double-track steel cars, double-track wooden cars?

With current cost at 2 cents per kilowatt-hour, what will it cost this company to burn a cluster of five 23-watt lamps twenty-four hours per day? How much per year?

How many watts in an electrical horsepower?

If a vehicle is damaged in collision with a car, who should care for the damaged property? Why?

Why should dispatchers or inspectors spend as much time as possible riding on the cars?

What height does the law require a trolley wire to be above the rail at steam crossings?

Before any work is started on a new construction job, what should be done to be sure that there will be no misunderstanding with the accounting department?

Who controls the advertising space in the regular advertising racks in our cars? What is the address of this firm?

What is the title of the official organ of the American Electric Railway Association?

Who is the secretary of this association?

Who controls the patented devices on safety cars?

Name a manufacturer of: (a) trolley wire; (b) car jacks; (c) car gears; (d) steel ties; (e) automatic block signals; (f) fare boxes; (g) car heaters; (h) carbon brushes; (i) rail bonds; (j) steel rails; (k) brake shoes.

What company publishes the ELECTRIC RAILWAY JOURNAL?

Give the full name and address of the manufacturer of our No. 514 motors.

How many companies manufacture air brakes for street cars? Give their full names.

On a good rail and with brakes in good order, with a seated load, in what distance can the ordinary car be stopped, running at a speed of 18 miles per hour?

What per cent of 720,000 is 540,000?

If the receipts of a company are \$650,000 per year, and its operating expense is 87 per cent of the receipts, what are its operating expenses?

Why should a date always be put on all data and inter-office communications?

In addition to all construction expense, to what boroughs did these companies pay a bonus? Show the amount paid each.

What is the total amount of bonds of the Beaver Valley Traction Company in the hands of the public?

What is a watt?

What is voltage?

What is an ampere?

What was the number of car riders carried last year by both companies?

How much of a dividend is paid each year on the stock of the Beaver Valley Traction Company?

Give the name and address of the manufacturer of Spear-mint gum.

What baking powder is advertised in our cars?

What bank advertises in our cars?

What is the distance from Junction Park to end of line, Morado?

What is the distance from Junction Park to Sassafraz Alley?

What is the distance from Ferry Street to Leetsdale?

How many thousand car-miles life do we get out of 33-in. steel wheels?

What does "C.M." stand for when used in connection with wires and cables?

Name five street railway companies which are in the hands of receivers.

How many more seats do we furnish per day than there are passengers to ride?

If each conductor should fail to register one fare for each zone that each car passes through per day, what would the loss to these companies amount to in one year?

Give the exact location of: H. H. Robertson Company; Moltrup Steel Products Company.

What is the cost of welding a joint by the Lorain process?

What is the cost of excavating for and replacing the paving after welding?

How long should these joints increase the life of the rail?

Foreign Standards Available Through A. E. S. C.

THE American Engineering Standards Committee has selected and listed a large number of standards issued in 1921 by foreign national standardizing bodies. Copies of these can be had from the office, 29 West Thirty-ninth Street, New York City, at merely nominal prices.

Among these standards may be mentioned tramway tires and tramway axles (British), benzol for motor fuel (British), creosote for the preservation of timber (British), brick (Canadian), bolts and rivets (Canadian) and roofing tiles (German). More than 100 specifications are included in the list. In acting as sales agent for the standardizing bodies of other countries, the Standards Committee is carrying out a plan which is being followed throughout the standardizing countries.

New Facilities for Kansas Interurban Improve Earnings

BY C. M. MORRISON

Traffic Manager Arkansas Valley Interurban Railway,
Wichita, Kan.



**Private Right of Way Into
Wichita and New Passenger
and Freight Terminals and
Shops Built, Roadbed Im-
proved and New Steel Cars
Purchased**

At the top is an observation trailer used with two and three-car trains. Below at the right is shown the latest type of all-steel passenger car in use on the Kansas lines; at the left, a work train distributing ballast in improving roadbed.



SINCE the property of the Arkansas Valley Interurban Railway, connecting Wichita, Kan., with Hutchinson and Newton, Kan., was described in the issue of the *ELECTRIC RAILWAY JOURNAL* for June 2, 1917, Vol. 49, page 996, rather extensive improvements have been made. These have included the purchase of new all-steel passenger cars, the building of a new passenger station and general office building, freight terminal and shop in Wichita, the building of a private right of way into Wichita and general improvements over the road.

Formerly, entrance into Wichita was made over the tracks of the local street railway company, but it became evident in 1918 that the passenger, express and package business handled by the interurban company was growing to such an extent that it would be greatly to its advantage to operate over private right of way. Such a right of way through the north and west sections of the city was secured during the next two years, and in 1920 the new track was built, leading to the 12-acre terminal site located on the east bank of the Arkansas River at Douglas Avenue, which had been purchased by the company. This piece of ground is only four blocks away from the main business center of Wichita, providing a very favorable situation for the passenger and freight terminals of the interurban line.

A beautiful new two-story passenger station and general office building was erected during 1921, facing on Douglas Avenue. A new freight station located almost directly behind the passenger station and fronting on Vaco Avenue was also built. The building of the

terminal track, the two-story freight station, the two-story passenger station and general office building, the retaining wall along the river, and a five-track shop located on the opposite side of the river, were completed at a cost of \$380,000. The use of the private right of way and new terminal facilities has made it possible to cut from five to ten minutes off the running time of various trains.

The new Wichita passenger station and office building measures 100 ft. x 100 ft. and is built of dark red tapestry brick with stone trimmings and green tile roof. It is considered one of the finest stations of its kind in the country. The ground floor comprises a large waiting room located at the rear of the building and connected with the Douglas Street entrance by a long, wide corridor. The height of this waiting room takes in the entire two-story height of the building. The ticket office is located at one side of the waiting room and the baggage and express room directly opposite. There is an up-to-date restaurant and lunch room adjoining the waiting room, and the remainder of the ground floor is given over to various shops. A ladies' rest room and men's smoking room are provided directly off the main waiting room, and the stairway to the general offices upstairs also leads off the waiting room.

The interior of the waiting room and corridor is finished in buff-colored tapestry brick with glass partitions and oak woodwork separating it from the restaurant and shops. All of the second floor of the building is used for the general offices of the company and these rooms are reached from a hallway or balcony

Some of the Improved Facilities Which Have Resulted in Increased Business
for the Arkansas Valley Interurban Railway



No. 1—New passenger station and general office building at Wichita, Kan.

No. 2—Waiting room in the new interurban terminal, Wichita, Kan.

No. 3—Interior construction and equipment of new Wichita shops.

No. 4—New interurban freight station at Wichita.

No. 5—Six-track shop recently built for Kansas interurban.



NEW HOTEL ADJACENT TO INTERURBAN TERMINAL
NEARING COMPLETION



RETAINING WALL ALONG ARKANSAS RIVER WHICH PROTECTS
NEW STATION—NEW HOTEL IN BACKGROUND

which overlooks the passenger waiting room below. All of the offices in the building are finished in natural oak except that of the president, which is finished in mahogany.

The new freight station at Wichita is constructed of red brick with the freight room on the first floor and three offices and a large room, where meetings and social sessions are held by the trainmen, on the second floor.

The new car shops are of up-to-date design and provided with six tracks and all well equipped for handling the equipment repair work.

Industrial tracks are now being put in to reach several of the larger industries at Hutchinson, Kan., and

	1914	1916	1918	1920
Gross earnings	\$137,454	\$271,107	\$328,611	\$547,375
Operating expenses	79,612	140,684	228,737	337,254
Net earnings	\$57,842	\$130,423	\$99,874	\$210,121
Interest and taxes	58,387	83,222	95,150	79,646
Net revenue	\$545*	\$47,201	\$4,724	\$130,475

* Loss

also track connections with some of the steam roads. Other steam-line connections are expected to be put in at Newton. Through traffic arrangements with the steam lines are anticipated, and with these physical connections the interurban will be in position to handle all classes of freight, both carload and l.c.l., to and from all points, which should be the means of very materially increasing the freight revenue.

Another thing which may bring additional passenger business to the interurban is the construction of a new

\$600,000 hotel to be known as the Broadview, on property adjacent to the interurban passenger terminal. While this hotel is not the property of the interurban, a large amount of the stock is owned by stockholders of the railway, and it is planned to have a large arched corridor directly connecting the lobby of the hotel with the passenger terminal.

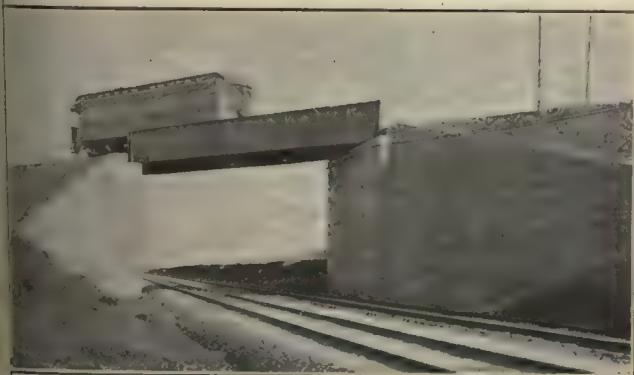
That these various improvements have been instrumental in improving the operating efficiency of the company and bringing new business to it is shown by the accompanying operating statement of the company for two-year periods since 1914.

Santa Fe Line Proposes to Extend Into San Pedro Harbor of Los Angeles

THE Board of Harbor Commission of the city of Los Angeles has granted the Atchison, Topeka & Santa Fé Railway permission to enter into the Los Angeles harbor at San Pedro for the purpose of constructing and maintaining a railroad line into the harbor in competition with the Southern Pacific Line, Los Angeles & Salt Lake Railroad (Union Pacific System) and the Pacific Electric Lines. In order to reach the harbor the Santa Fé is obliged to construct a branch extension of some 15 miles from a point on its Los Angeles-Redondo Beach branch line, diverging from this branch line at some point between Inglewood and Redondo, thence to the harbor at a point at the northwest corner of the west basin of Los Angeles harbor.

The project will involve the expenditure of approximately \$2,000,000. It will be undertaken as soon as certain franchises are granted by the city of Los Angeles and permission obtained from the Railroad Commission, as well as from the War Department, to span the west basin with a trestle.

Practically all the municipally owned tracks of the city of Los Angeles at the harbor serving the municipally owned wharves and warehouses in the inner and outer harbors, as well as numerous large industrial plants, are electrified and electrically operated. The city's trackage of approximately 12 miles equivalent single track was electrified at time of original construction, and the switching on these tracks is performed by the electric locomotives of the Pacific Electric Railway, which has interchange connections with the city's trackage and handles the service for the city through agreement.



A. V. L. CROSSING OVER SANTA FE TRACKS ON NEWTON BRANCH

Checking Idle Time of Locomotives and Service Cars

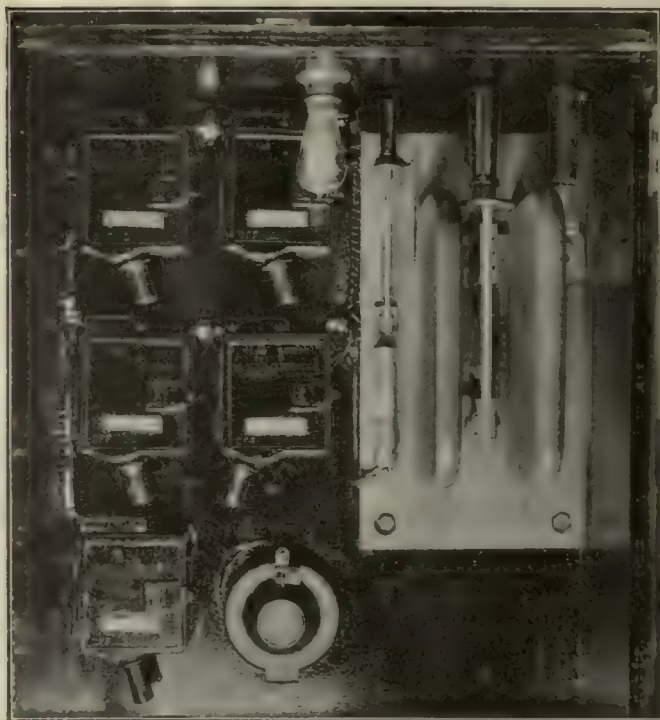
Compact Device of Simple Design Makes Graphic Record of Movements—Keeps Crews of Trains Not on Time Card Working and Accounts for Legitimate Delays

MANY freight trains, line cars and maintenance of way work trains on an interurban railway are operated without definite schedule time and do not appear on the time cards. They operate between towns and passing points and work points, and keep in the clear of scheduled traffic on orders from the dispatcher. The crews of such trains are therefore out on the line largely without supervision and the amount of work they do is at their own discretion. As a natural human trait, some loafing develops.

As a check on the idle time of these "extra" trains, the Illinois Traction System has installed on twenty-five of its electric locomotives a small device called a "service recorder" which makes a twenty-four-hour graphic record of the time during which a locomotive is running or standing idle. This device is manufactured by the Service Recorder Company, Cleveland Ohio, and consists of a simple clock mechanism for driving the paper chart and a pivoted weight having a steel point which bears against the paper chart. The whole mechanism is contained in a neat little steel case about 6 in. in diameter and 4 in. thick, and the device may be mounted anywhere in a car. When the engine or car is standing, the device produces a simple line on the chart, but while running, the vibration causes the weight to swing slightly, producing a jagged mark. The use of a special type of paper results in a distinct marking of the chart without the use of ink. There is therefore nothing to do to keep the device operating except to wind the clock and replace the chart once in twenty-four hours. On the Illinois Traction System locomotives, the device is mounted in the bottom of the switch cabinet, where it cannot readily be mechanically connected with

the air pump, for example, to produce an artificial motion record. The value of the device is greatest on engines engaged entirely in switching, as the dispatcher has some check on a train out on the road, but he has practically none on a switch engine. A device is taken off a locomotive now and then and put on a line car for checking up on the work done by a crew stringing trolley wire, setting poles, etc., or on other work cars for a check period. If excessive idle time appears on the chart, a check-up is made.

The routine on the Illinois Traction System is that the mechanical department inserts and removes the charts and forwards them to the superintendent, who has the chart checked with the train operation report



"SERVICE RECORDER" MOUNTED IN SWITCH CABINET OF AN ILLINOIS TRACTION SYSTEM LOCOMOTIVE

daily. If the chart for any locomotive shows up excessive idle time, the superintendent writes a letter to the crew for explanation, and then the reply and the whole correspondence are forwarded to the general manager.

A typical chart taken from the "service recorder" is reproduced herewith. By consulting the train operation report, the movements of the particular engine can readily be traced and explained for the day, as follows:

The engine left Springfield, Ill., at 7:01 p.m., with fifteen cars of grain for Granite City, Ill., where it arrived at 6:30 a.m. En route, at 11:10 p.m. it had to clear, at the Alton siding, a northbound fast freight train which had the right of way. There was a delay of nearly forty-five minutes here waiting for the passing. It was necessary for the train to remain here rather than to proceed further while waiting, as the next passing point was beyond Carlinville and there was work to be done at Carlinville. The train then lay at Benld from 1:15 to 2:10 in order to clear a sleeping-car train. The freight train left Benld right after the sleeping-car train showed up, indicating that the crew had completed the loading and unloading work at this point before the wait for the passenger train began, although there was evidently not time to go to the next siding to make the meet. By thus studying the train operation report, it is seen that in this particular case the two delays were explained to be legitimate. There was also an allowance of twenty minutes for lunch which may have been taken at Benld. This illustrates how a long standing period as recorded on the device may be analyzed to disclose unwarranted idleness.



A TYPICAL CHART MADE BY "SERVICE RECORDER" MOUNTED ON LOCOMOTIVE

The first one-man safety car in England is being tested out by the London United Tramways. Owing to the absence of a double deck and other special features, it is attracting considerable attention. About the only change from the standard American style of car is the use of track brake.

Electric Railway Publicity

Devoted to How to Tell the Story

\$825,000 of Preferred Stock Sold

Publicity Playing a Very Important Part in Distributing Security Issue Among Residents of Territory Served by Northern Ohio Traction & Light Company

BY E. B. ATCHLEY

EMPLOYEES of the Northern Ohio Traction & Light Company, Akron, Ohio, began the sale of the company's 7 per cent preferred stock to the public last July. At the close of business on Feb. 28 approximately 6,750 shares of a par value of \$100 each—\$675,000—had been sold by them. About 1,500 shares have been sold through other sources, bringing the total to a little more than \$825,000 in approximately seven months.

How was this accomplished in view of the business depression so keenly felt in that section of Ohio traversed by the lines of the company? That is the first question to arise. What methods were adopted to interest the employees and to keep that interest aroused? That, perhaps, is the second question to arise. Every company planning to start a customer-ownership stock selling movement is interested only in this—and presentation of the advantages to the public.

The Northern Ohio Traction & Light Company has approximately 2,000 employees. When the movement to sell the stock was launched in July, meetings of employees were held in every department over a period of a week. The reason for issuing the stock and the reasons why the employees were needed to sell it were thoroughly explained by A. C. Blinn, vice-president and general manager, and other company officials. At these meetings the employees were asked to buy stock.

DETAILED PREPARATION FOR SALE

Prior to calling the meetings, the company had prepared an extensive advertising campaign. The issue was thoroughly explained in the employees' magazine. Letters to all employees and all customers had been prepared and signed by Mr. Blinn and were ready to go into the mail. This advertising—letters, magazine, all literature—was released immediately following the meetings with employees. The newspaper advertising and the street car advertising were used effectively to back up the employees. Each advertisement contained this line: "Ask any employee for information."

Almost 1,700 shares had been sold by Aug. 1 and 1,450 more were sold in August. Most of these 3,150 shares were taken by employees. The work of selling the actual stock to employees proved easy, despite the fact that the plan was launched immediately following a strike of the trainmen. The task of selling them the idea of selling customers proved not so easy, however. Trainmen were particularly slow to take hold in the sale. The employees in the ways and structures department—track men—were the first to respond to the appeal. In September 516 shares were sold to customers principally by the track gangs—the men who use the pick and shovel. The production and distribution department

employees had a hand in the sale, but not to any great extent. General office employees sold very little.

In October and November, in view of the great number of unemployed in Akron and the coming of winter, there was a heavy decline in sales. In December sales picked up to 1,054 for the month, held steady in January and February, while in March about 1,500 were sold, indicating a steady purchase of 1,000 to 1,500 shares by customers monthly.

AROUSING INTEREST PLAYS BIG PART

Now, how has the interest been kept up? The answer to this may prove worth while to companies contemplating permanent financing by this method.

In the beginning, employees were paid a commission of \$3 for the sale of one, two, three or four shares, \$5 for five shares and 50 cents per share for each additional share to one individual. Special editions of the *Northern Light*, the company publication, were issued weekly containing names of employees who made sales and the number of shares each man sold. Meetings were held weekly with the heads of all departments to discuss the sale of the stock and special meetings were held with the men monthly. An employee of the company who had been placed in charge of the sale talked to all employees once every month, going out to the track and line gangs, shop men, track men and all others. In most instances these talks were delivered to the men in small groups. The men stopped work for a few minutes until the talk and the discussion were ended, when they went back to the job. Appeals were made again and again. After two months only forty-five employees out of 2,000 were actually producing, although prospects were being turned in by about 150 others. It was an uphill job, but after six months effort more than 150 employees are now actually making sales and 1,000 or more others are turning in live prospects.

Late in November the slogan "Buy a Share of Stock for a Christmas Present" was taken up. This slogan, carried in all the advertising, pushed up the December sales. In January, to keep the interest going, special bonuses were offered to the individuals selling the greatest number of shares, to those selling to the greatest number of individuals and to the department making the best sale record. In all, seven prizes were offered.

Following this a new plan was adopted. The commissions were increased to a point where each employee now receives at least \$1 for each share he sells. In addition, a special bonus has been arranged. A quota of 1,000 shares was set for the special contest now in progress. If the quota was reached in March each man producing sales received an additional \$1 per share. If 1,100 shares are sold, the producing employee receives a bonus of \$1.10 per share, or if only 900 are sold the bonus is 90 cents per share and so on, up or down. This method of arousing interest is proving the most effective of all.

In the stock department of the general office in Akron

hangs a large chart showing the day-to-day standing of all departments of the company. On this chart the thermometer idea is carried out, the changing conditions appearing in red paint on the thermometer. The chart shows seven departments with the quota for each department. This quota is based upon the number of employees in the department. Similar charts on a smaller scale are placed with each of the seven departments and there is an additional chart showing the department subdivision which is painted in the same manner. This has brought the responsibility for selling the quota assigned to very small subdivisions. For instance, the general office is divided into accounting, billing, commercial, cashier, credit and collection, meter reading, stenographic, payroll, purchasing and claim departments. There is a thermometer showing the standing of each of these divisions based on the quota assigned to it.

STOCK DEPARTMENT RESEMBLES BROKER'S OFFICE

Aside from the charts referred to, there is a large wall map of the system hung in the stock department. Whenever a share of stock is sold a pin goes into the map at the point where the purchaser resides. Needless to say, there are a few thousand pins in this chart, and it is pretty well plastered up. There is little doubt that the map will prove interesting to aspirants for office in this section in the future when questions concerning this utility arise.

Every morning the department head calls the subheads in his department and receives the stock report. This has brought about strong rivalry among the various subheads and often the stock department resembles a broker's office where the tape is bringing figures to be chalked up.

Daily bulletins are quickly made up and are sent to the departments pointing out what some department has accomplished and spurring the others along. These bulletins keep the interest going and have been instrumental in building the sales. Stickers with commission and regular pay checks bearing the words, "I Am Doing My Share, Are You?" and "Sell a Share a Month" also aid in keeping up the enthusiasm.

And now a word about publicity advertising the stock. The price of the stock was fixed at \$95 a share and accrued dividend. This price yields the purchaser 7.37 per cent. These figures—7.37—have become synonymous with the company stock the whole length of the system. They appear on all company envelopes, on stickers, in all cars, billboard and newspaper advertising. When the customer-ownership plan was started solid red posters bearing the figures 7.37 in white went into all cars. This created interest and people began asking what they meant. Five days later other solid red posters were displayed in the cars. They carried the words "7.37 per cent. The N. O. T. & L. Co. is offering its 7 per cent cumulative preferred stock at \$95 and dividend per share, yielding 7.37 per cent."

The first newspaper advertisement consisted of a full page in all papers in the territory, changed to meet local conditions. In Akron the advertisement dealt principally with the light and power business. Outside of Akron it was confined to the railway business. "Make These Sockets Earn You Money" was the heading of the one with a giant hand turning on light in the home. The other bore the heading "It Earns as It Runs," the words carrying an interurban train. The page advertising was followed by "ads" of four full columns, illustrated,

with the headings: "Your Salary May Stop, but Dividends Keep Coming In," "The 'Old Age of Want' Bogie," "Prepare Your Boy for the Battle of Life," "Put the Northern Ohio Traction & Light Company on Your Investment Map," "Protecting Your Electric and Transportation Service When There Is a Storm," "S.O.S." and "The Finest Christmas Present in the World."

Three-column "ads" followed these. Later, however, the "ads" were dropped to two-column, 8 in. Today very little newspaper advertising is being done. Two novel window displays, one consisting of a miniature city, electrically lighted and containing a street railway system with moving cars, and the other displaying the entire interurban system from Cleveland to Uhrichsville, attracted the attention of thousands. These displays widely advertised the stock. In the miniature city little billboards, advantageously placed, urged stock purchases. The displays were in the windows of the Terminal Building, Akron, and just inside that building a "Stock Department" was established, with an employee in charge who had been a successful salesman. Steadily through all this the *N. O. T. & L. News*, the weekly publication placed on the cars, carried information concerning the stock with a blank to be filled out by all persons interested. Many good prospects were developed from this source.

The methods adopted in the sale of stock of the Northern Ohio Traction & Light Company are the same as those that have been adopted on the Consumers Power Company in Michigan, in Peoria, Ill.; Springfield, Ohio; Evansville, Ind., and on other properties operated by Hodenpyl, Hardy & Company, who also operate the Northern Ohio property. On all these properties the sale of stock has been successful, not only in the amount issued to customers but in the establishment of increased confidence and good will.

Publicity Popularizing Weekly Pass

After You Light Up at the Cigar Store Buy a Pass for Fort Wayne City Lines for \$1 Good for a Week—Company Supplements Its Original Work

THE Indiana Service Corporation in starting its new weekly pass system on the city lines in Fort Wayne, Ind., relied entirely upon newspaper publicity to acquaint the public with the innovation and to work up a good sale of the passes. No car cards, booklets, folders, billboards or other methods of advertising were used. But the newspaper space used was very large; half-page ads predominated. The newspapers, of course, devoted much news space to the passes, thereby greatly increasing the publicity secured for the new plan.

Later on the company intends to issue a booklet similar to the one which it now uses, and in which the schedules for the different lines are given and in which there is much general information concerning the company. The corporation also intends to include all the information regarding the passes in this booklet. It will be widely distributed on the Fort Wayne city cars, at cigar stores and through the mails.

The initial information which the people of Fort Wayne received as to the intention of the company to sell weekly passes for a dollar good at any time during the week on any Fort Wayne city lines—these passes being transferable—was through news items in the local daily papers.

Following this initial shot—this news being played up by all the local papers quite extensively on the first pages under big headlines—the corporation placed a half-page ad in all the papers. This announcement read:

"THIS IS THE WEEKLY PASS.

"Indiana Service Corporation.

"Weekly Pass.

"Feb. 27 to March 5, 1922 (Inc.).

"Pass bearer on cars of the Indiana Service Corporation within the one fare limits of the city of Fort Wayne for a period of seven (7) days as shown by dates on the face of this pass.

"Pass must be shown conductor upon entering car and is good only for one (1) passenger.

"No. 3994. SAMUEL W. GREENLAND."

(S. W. Greenland, it might be noted here, is the general manager of the company, so is the person to sign the passes as indicated above.)

"Savings.

"If you ride twenty times per week your fare will be 5 cents. If you ride thirty times per week it will be 3.3 cents per ride.

"Why not buy a weekly pass and ride home to lunch. Get a hot home cooked dinner.

"It's cheaper than shoe leather, why walk to and from work? Buy a weekly pass—save time and energy.

"Why fuss every morning with that cold engine?

"Warm, comfortable street cars are ready to serve you at any time. The \$1 weekly pass makes it convenient and economical.

"Money saved is money earned, buy a weekly card pass, save car fare and deposit the difference in a savings bank.

"Pass can be purchased from our operators.

"The weekly pass will save time in loading and relieve congestion.

"Transfers are unnecessary for passholders.

"Passholders may ride as frequently as desired and transfer to suit their convenience."

The foregoing advertisement appeared in the local papers without change several times during the week preceding the start of the new system.

During the second week the new system was in force the company used the following ad in all the papers in half-page space:

"WEEKLY PASS.

"The popularity of the weekly pass has been indicated by the sales during the sale period, from Friday to Monday inclusive, viz.: the first week 2,967 were sold and the second week 3,546, making an increase of 579.

"Some confusion has developed relative to transfers since the weekly pass has been put into effect.

"Transfers will not be issued to passholders and therefore it becomes absolutely necessary that all passengers paying cash fares or tokens must request their transfers when they board the car and at time of paying their fares; otherwise transfers will not be issued.

"To issue transfers after fare has been paid not only imposes a double duty on the operator, but very materially interferes with loading and unloading of passengers. Neglecting to get your transfer at the proper time only stimulates the forgetting habit and in turn often results in unpleasant controversies and misunderstandings. The operator with his many and ever changing passengers cannot be expected to know whether a transfer has already been issued; neither does he know whether you paid your fare by presenting a pass and therefore are not entitled to a transfer.

Compliance with these instructions will prove to our mutual advantage.

"We solicit your co-operation.

"INDIANA SERVICE CORPORATION."

One other advertisement, also half page in size, which was a slight variation of the ad quoted above, was used in putting over the pass system with the Fort Wayne public.

That the publicity combined with the value of the system effectively "sold" the new system to the Fort Wayne public is indicated by the record of passes sold during the first month's operation of the system. Here is the record: First week, 2,967; second week, 3,546; third week, 3,517; fourth week, 3,722.

The officials of the company believe that when the system's value is fully appreciated by the general public

the sales of passes will run up to 5,000 or 6,000 a week. It is the intention of the corporation to continue its newspaper advertising, using smaller space, though, than has so far been used and telling the real news of the pass system in these advertisements. It is believed that by showing by figures just how the use of the passes is growing and by telling specific instances of people



HOW THE Journal-Gazette ARTIST SAW THE PASS IN A PLAYFUL MOMENT

who have found the use of the passes a big saving and who by using passes have been able to get home during the noon hours when they were formerly unable to do so, more will be done to popularize the pass than could be done by any amount of plain, unadorned urging of folks to buy the cardboards.

It is interesting to know that the adoption of the pass system on the Fort Wayne city lines of the Indiana Service Corporation has been welcomed by the operators of the cars—most of the lines are one-man car lines—and that the use of the passes has greatly expedited the loading and unloading of cars.

Passes are on sale by operators and conductors from Fridays to Mondays and are also on sale at the Alter Cigar Store and the Riegel Cigar Stores at the "Transfer Corner," where all the city lines meet, during the same period. The number of passes sold by the cigar stores is negligible, but by having the passes on sale at these stores the corporation gets more publicity for the stunt and this having the passes on sale there also has a psychological effect toward popularizing the use of the passes.

The newspaper advertising space used by the corporation was partly paid for in transportation. Each month the corporation settles up on a cash basis for the transportation used by the papers and the advertising it has used.

Express Service Defeats Jitneys

THE way to beat the attractive features of competing jitney service is to offer features equally or more attractive! That is the theory of the officials of the United Electric Railways, Providence, R. I., and it seems to be working out in their recent experiment of fast express service between Providence and Pawtucket.

For several years the passenger-carrying automobiles, jitneys and motor buses have been making heavy inroads into the revenues of the street car lines in and about Providence. There is a steady flow of traffic at all times between Providence and its near neighbor Pawtucket, a city of textile mills, about 4 miles away. Into this traffic the automobiles cut heavily. A veritable flock of jitneys throng the "Loop" at Providence and when they secure a load start off for Pawtucket.

On Jan. 16 the United Electric Railways inaugurated an express service and advertised it thoroughly by means of dasher signs and the press. Express cars leave each end of the line every ten minutes all day. They make stops to receive and discharge passengers only in

the center of the two cities, running without stops outside of the congested district. They start just ahead of the local cars, and so make the run without delay.

The run of 4.1 miles is made in eighteen to twenty minutes, depending on traffic conditions. The fare is 12 cents. This is a little faster than the motor buses, which charge a 10-cent fare. The jitneys, so called, which are ordinary passenger touring cars, independently operated, make it in about fifteen minutes, but charge a 15-cent fare. As the jitneys do not start on any schedule time, but wait for a paying load, the regular ten-minute starting schedule of the railway offers a favorable factor of dependability.

White dasher signs 21 x 22 in. are carried on all the express cars. They have large red letters calling attention to the special service. These signs read as follows: "Ride on the cars between Providence and Pawtucket. Time-saving express service now in operation."

Officials of the United Electric Railways are enthusiastic over the results already secured. They assert that patronage on this line already has doubled.

Valuation of Public Utilities for Taxation*

An Outline of the Wisconsin Ad Valorem System of Valuation for Taxation
Purposes Is Presented—Why a Rate Valuation Is Not Applicable
as a Basis to Compute Taxes

BY EDMUND J. BRABANT

Public Utility Statistician Wisconsin Tax Commission, Madison, Wis.

GAS, electric and street railway companies in Wisconsin are paying in taxes approximately 25 per cent of their net income which would otherwise be available for interest and dividends. In 1910 these companies paid in taxes \$548,500. For the year 1921 they were called upon to pay \$2,473,000—four and one-half times as much as in 1910. The total assessed valuation increased from \$58,749,635 in 1910 to \$117,503,422 in 1921. The average rate of taxation has increased from .01125 in 1910 to .02106 in 1921.

The question is sometimes asked, "What is the use of taxing public utilities at all if the facts are, as commonly stated, that the public pays the tax? Is not this the same thing as taking money out of one pocket and putting it into the other?" The answer to this question, however, is quite obvious to anyone who will give the matter a little thought. Even in communities where the widest use is made of the service offered by the utility there remains a large proportion of the tax-paying public who make little or no use of it. Then it must be remembered that rural communities do not have as a rule an opportunity to obtain service. So that, if this property were exempted from taxation, the deficiency caused by such exemption, which would have to be met by increased taxation of other property, would fall upon all taxpayers, user and non-user alike. In my opinion all public utilities should be taxed, including municipally owned utilities. The failure to charge taxes against a consumer in

the case of municipal utilities is unfair to all other taxpayers who are unable to obtain service.

Taxes in 1920 were more than ten times what they were in 1880, while the population of the state had merely doubled in the same period. To put it in another way, government cost each individual in this state in 1880 \$6.92, and in 1920 \$36.58. This, of course omits all federal taxation. Unfortunately the increases are not evenly spread between different years. That is in 1919 the increase over the previous year was 37 per cent. On top of this in 1920 there was another increase of 24 per cent. We are now enjoying what may be called a lucid interval, the increase of 1921 over 1920 being but 1 per cent. The average rate applicable to public utilities for the year 1922 will be \$21.16 per thousand while in the year 1921 it was \$21.06 per thousand.

The Tax Commission is not, of course, responsible for levying taxes. The Tax Commission is, however, responsible for valuations put upon the property of public utilities which it assesses, and must be held accountable to the owners and operators of these properties and to the public for valuations in accordance with law and equity.

The support for the activities of the state government is derived largely from taxes paid by these companies. There has been no levy upon the general property of the state for state purposes since 1913. Mill taxes paid to the state treasurer for education and highways, while often spoken of as state taxes, are not in fact used by the state government. The state merely administers these funds for and dis-

tributes them to the local units. The classes of companies valued and assessed by the tax commission with the amounts of valuation and taxes on each for the year 1921 are as follows:

ASSESSMENTS AND TAXES—PUBLIC SERVICE CORPORATIONS IN WISCONSIN, 1921

	Valuation	Taxes at .02106389
Railroads	\$345,559,000	\$7,278,816.75
Street railways*..	74,085,000	1,560,518.20
Telegraph	4,825,000	101,633.27
Express	500,000	10,531.94
Sleeping car.....	1,600,000	33,702.22
Freight line.....	1,350,000	28,446.79
Improvement	375,000	7,898.95
Water, gas and electric	43,418,422	914,559.86
	\$471,712,422	\$9,936,107.98

*Includes gas and electric utilities operated in connection.

WHY A SPECIAL SYSTEM IS USED

The system in Wisconsin for the taxation of public utilities is known as the ad valorem system; that is, valuation is the basis for computing the tax. Most of the states of the union have a species of ad valorem taxation of public utilities, although a few, of which our neighbor, Minnesota, is one, seem to prefer the license fee system, that is, a tax on gross revenue. Wisconsin discarded the license fee system about twenty years ago. The trouble with the system in this state was that there was constant complaint that public service corporations were not paying their proper proportion of taxes. Attempts to increase the rate of the license fee met with determined opposition on the part of railroad companies. They claimed that in view of the fact that intangible property, consisting of

*Abstract of paper presented before joint meeting of Wisconsin Gas Association and Wisconsin Electrical Association, Milwaukee, Wis., March 23, 1922.

stocks, bonds, mortgages, bank deposits, and money, practically escaped taxation, that the railroads in comparison, when taking into account this property, were paying more than their share of taxes under the license fee system. The failure of the attempts in the Legislature to increase the license fee over 4 per cent, which was then being paid as a maximum, resulted in the adoption of the ad valorem system. It was felt that the only way of putting public utilities and other property on an equal basis for taxation was to apply so far as possible the same methods in their taxation. So valuation became the basis for these properties as well as the general property of the state.

The word "valuation" as applied to the property of public service corporations in this state, as well as in several other states, requires explanation, interpretation and qualification. It is clear that the word as used in our laws does not always carry the same significance. The statutes require valuations to be made for several different purposes:

1. Taxation.
2. Rate making.
3. Purchase by municipalities.
4. Capitalization.

The statute specifically requires that the property and franchises of all these companies are to be assessed at "true cash value," but you will look in vain to find any direction as to how this true cash value is to be ascertained. While the statute lists a multitude of data which must be reported, it does not specify which are most important or significant, or what is to be the basis of the valuation. Neither does it require a classification of the properties included in the valuation. For example, no separate classification is required of tracks and cars in the case of electric railways, or of the generating plant, transmission lines and distribution systems in case of gas and electric plants.

The law with reference to the assessment of real and personal property is somewhat more specific. As to real property, the statute directs that it shall be assessed "at the full value which could ordinarily be obtained therefor at private sale." This has been construed by the Supreme Court to mean not such price as would produce a purchaser, for that would manifestly be a forced sale, but such value as could ordinarily be obtained by an owner assuming that he desired to sell, and that there was a purchaser with means desiring to buy.

FRANCHISE AND GOING VALUE

Undoubtedly among the reasons for placing public service corporations in a special class for valuation and assessment is that under the law they enjoy special privileges, among which are right of eminent domain and in most cases virtual monopoly, these being inherent in the nature of the business. These rights and privileges may and often are of considerable value over and above investment in property. In

other cases, they seem to be 'worth little or nothing. The statute specifically requires that value of franchises, if there is such a thing, be included. Furthermore, the system set forth in the statute evidently contemplates that these companies shall be valued as going concerns, and not as so many parcels of real estate and items of equipment. In fact, it must be admitted by every one that a street railway, electric or gas plant, is something more than mere land, rails, cars, wires and machinery. It is a live, going business, guided by brains and having rights and privileges which give it an organic unity. The theory of our ad valorem tax law as applied by the Tax Commission was upheld by our Supreme Court in an exhaustive opinion involving the first valuation for assessment purposes of railways (Chicago & Northwestern Railroad vs. State, 128 Wis. 553).

The meaning of the word value as taken for tax purposes is market or exchange value. Now, in putting a price on a parcel of land, a residence or business block, the customary manner is to ascertain at what figure similar properties have sold. Such value in the long run is based on the opinion of the public, or more particularly, persons who stake their money back of their judgment. There is no better guide than this to market value. It is the basis of the method employed by the commission in fixing the value of real estate in the state equalization. Unfortunately for the Tax Commission, the larger public utilities, unlike other properties, are rarely sold as units. When transferred, it is usually by the sale of stocks and securities. Where these are quoted on the market, they afford one means of determining value. This method would be sufficient and adequate without other data perhaps were it not for the fact that as only a portion of the stocks and bonds of a given company are sold in any one year, it is questionable whether prevailing prices would hold in case a controlling interest were offered for sale. Besides this, the securities of any public utility usually represent not only property useful in the public utility business but also investments made in securities of other corporations and other investments having no relation to the public utility business. For these reasons, additional methods must be employed for comparison and verification even where the data are available. They are, in fact, not available for most of the street railway and electric companies assessed by the commission.

CAPITALIZATION OF NET EARNINGS

This method is based on the same theory that obtains in valuing annuities; that is, that the capital value of a given annual income may be computed, providing the length of time such annuity is to run is known or can be approximated. Now earnings of public utilities, unlike annuities, are

not uniform. They fluctuate from year to year, depending upon a variety of circumstances, management, markets, labor, local conditions, and the general trend of business. Furthermore, it must be kept in mind that it is not past earnings which really give value to these properties, but the value of future earnings, and this means earnings over a period of years. Of course there is no way of measuring future earning capacity except by past performance. The period taken has usually been five years. Averages of net earnings are computed and capitalized at various rates.

RATES OF CAPITALIZATION

The rates of capitalization employed being based on the rates demanded by the investing public necessarily cannot be uniform as to all classes of public utilities, nor even as to companies of the same character. Regularity, uniformity and stability, as well as amount of earnings, have an important bearing on the rates expected by investors. As a general rule the larger the company the less fluctuation there is in earnings. For this reason, the large interstate railways have been put in a special class, and the lowest rates have been applied to them. These rates range from 6 to 6½ per cent. In assessing street railways and light, heat and power companies, the rates have ranged from 6½ per cent to 8 per cent, depending on the hazard of the investment and the stability of the enterprise. Last year, the rates used were somewhat higher and ranged from 7½ per cent to 8 per cent. In a few cases involving small plants even higher rates were used, it being apparent that the revenues were large, and future prospects unattractive.

DEPRECIATION

In using this method, it must be borne in mind that, notwithstanding the rules of accounting prescribed by regulating bodies, there are marked variations in methods of financing and management, all of which affect net earnings as reported. It is therefore highly essential that in using this method of valuation the accounts should be looked into rather closely, in order to get at a correct statement of a net revenue. It would be manifestly unfair to capitalize the net earnings of a company as reported where no depreciation had been taken, as this would give entirely too high a valuation, as compared with the company which was taking a liberal amount. In practice the commission has added to or deducted from the net earnings of all companies assessed in order to put them on an equal basis in the matter of depreciation.

INVESTMENT

In the determination of valuation of public utilities for purchase, original actual cost, that is, what has gone into the property, has usually been considered a most significant factor. This

does not hold true as to valuation for taxation, for the simple reason that the original cost of a public utility does not necessarily represent its cash or market value any more than the cost of anything else represents its real value.

There has been no complete appraisal in recent years of the properties of public utilities in Wisconsin. From time to time the Railroad Commission makes appraisals for fixing rates, etc., which valuations are of course subject to examination by the Tax Commission. Our practice has been to take the last appraised value, and to add cost of improvements and extensions, and this is taken for the purpose of our records as the cost of reproduction of the physical property. The total cost of reproduction less depreciation of such properties as shown on our records is \$107,311,467, and the total true value for assessment for the year 1921 is \$111,444,229.

NON-PAYING PROPERTIES

There are a good many cases where the commission has no data relating to stock and bond quotations, and where there are no net earnings to capitalize, as the companies are running at a loss. There were five street railway companies in 1921 which reported deficits from operation, and in addition to this there were several others whose earnings were so low as to be insufficient to meet taxes and interest. Where these companies are operated in connection with light, heat and power companies, they have an advantage in this state. This is due to the fact that in arriving at valuations on the unit property including the street railway any deficits which may be suffered from operation on the street railway are deducted from the net shown by the light, heat and power property. It is impossible to state separately what the exact taxes are on the street railways proper, where they are assessed along with electric and gas properties. Our computations indicate that the percentage of taxes to net earnings runs about the same as for electric light properties in the case of companies operating street railway systems separately. In the case of non-paying properties, it has been the custom of the commission to assess them at greatly below the cost of reproduction. We have endeavored to ascertain if there was any future for properties of this kind, and if possible, what the owners would be willing to sell them for.

COMPARISON OF VALUATION FOR RATE AND TAX PURPOSES

From the inquiries which are occasionally presented, it is evident that many people are uninformed as to the methods used by the Tax Commission in arriving at the valuation of public service corporations. There seems to be an impression not uncommon that the valuation is based largely upon the cost

of reproduction of the physical property. The principal basis for a valuation for rate purposes is the investment in or, in case this cannot be ascertained, the cost of reproduction of the physical property. The owners cannot be allowed and have not in well considered cases been allowed to earn profits on anything more than such actual investment or cost of reproduction. Their claims in some cases of a right to earn on what was formerly considered valuable franchises, good will, increases in land valuation or capitalization of earnings have been denied. But your rejoinder may be, "Is not this amount invested or cost of reproduction really the value of the property in view of the fact that these companies are absolutely limited by the state to nothing more than the fair rate of return which is fixed by the state?"

This seems somewhat reasonable, but let us look at what is meant by fair return. As stated before, the purpose is to allow a high enough return to induce capital to develop new enterprises of this character. It must be remembered that the state or federal government, while it limits the profits of public utilities to a "fair return," does not ordinarily guarantee that or any other return. If the public or the local industries do not take advantage of the services; if the cost of the service is more than was anticipated; if the business does not develop as was expected, it is the investor's loss. The state will not reimburse him. In any private enterprise, the ever present danger of loss is offset by the possibility or probability of attractive profit. The attractiveness of investments in private enterprise must, therefore, be offset to some extent in the case of public utilities. The possibility of loss in public service enterprises must be met by the same inducement. A rate of return must be allowed which will attract capital sufficiently to brave the possibility of loss. For example, suppose that investors were willing to take the securities of electric lighting plants already established and with business worked up, say at 7 per cent. They naturally would not be willing to go into new enterprises with additional hazards on the same basis. So, to attract capital, a margin over 7 per cent must be allowed by the rate making body. Suppose this margin is 1 per cent so that the return upon which the rate schedules are based is 8 per cent; that a given utility with business established does actually earn 8 per cent. What is the result from a valuation standpoint; that is, from the standpoint of the investor? There can be but one result, and that is, that the investment or the stock, if it coincides in amount with the investment, will climb above par; that is, it will command a premium in the market. This is what actually takes place. A fair return, therefore, is such a rate as will draw capital into established

public service business plus such additional percentage as will invite capital into new enterprises along this line. Such a return when realized has the effect of increasing the actual or market value of the property. The actual or market value of the property, we will assume, was originally the same as the investment. At that time the valuation for rate and tax purposes should have been the same, but from that time on, with increases in business, it may never be the same again.

The foregoing indicates one of the important reasons why the same valuation cannot be used for rate making and taxation. There is, however, further reason. The purpose of a rate increase is, of course, to allow the utility a greater rate of return. The purpose of a rate decrease is to cut down the rate of return. A valuation fixed with these purposes in mind does not always work out as expected. There have been cases where rate decreases instead of cutting down the rate of return have tended greatly to increase the earnings and the rate of return upon the investment. In other cases, increases in rates have failed to increase the earnings or the rate of return. This has been found to be true recently in the case of street railways where people simply refuse to ride under the increased fares.

Another thing with reference to rate regulation should be mentioned. In this state it has been found impracticable to make wholesale changes in the rates of public utilities. As a usual thing changes are made only when a complaint or petition is filed either by the company or by a citizen. When these complaints are filed, there is usually a careful and comprehensive study made of the situation. It would be impossible to devote the necessary time to all of the utilities at the same time; to study all the varying conditions and to change all the rates. The Tax Commission, however, is required under the law to assess a large number of public utilities every year. The tax valuation can be determined with satisfactory accuracy in much less time than the valuation for rate making. It would seem from what has been said heretofore that it is unnecessary to argue that an increase in earnings increases the value of a public utility that whenever the Railroad Commission makes a change in the rate of any particular utility, this sooner or later will have some effect upon the market value of the property.

From the foregoing discussion I think a logical deduction may be drawn. That the so-called "fair valuation" for rate making is a misnomer. It may be fair, but it is not strictly speaking a valuation at all but rather a finding of cost—investment—what has gone into the property. What we are trying to arrive at for taxation is what is the market value—the actual value—and that depends on what can be got out of the property.

Experiences Exchanged by Members of C. E. R. A. Engineering Council

Mechanical and Way Department Men Discuss Wheel Diameter, Electric Welding of Wheel Flanges, Contact Devices, Bearing Metal and Allied Topics at Toledo Conference

A NUMBER of pertinent engineering topics were thoroughly discussed at a round table meeting of the Northern Section of the C. E. R. A. Engineering Council held in Toledo on March 14. Besides the chairman, the meeting was attended by eighteen railway men interested in mechanical and way matters. The principal assigned topics on which the experiences of the different ones were exchanged pertained to the adaptability of 26-in. wheels for city and lightweight cars, the building up of worn wheel flanges by electric welding and the relative merits of the sliding contact shoe and the trolley wheel.

SMALL WHEELS SATISFACTORY UNDER LIGHT CARS

In the discussion on whether or not the 26-in. wheel is the proper size for city and lightweight interurban cars, it developed that practically all the representatives had used this size wheel and found it to be satisfactory. A. Schwartz, Community Traction Company, was of the opinion that the 26-in. wheel was satisfactory under city cars weighing from 16 to 20 tons. E. B. Gunn, Western Ohio Railway, who has recently made some investigations along these lines, said that he was convinced that this type of wheel was practical for interurban service. The Cincinnati, Milford & Blanchester Traction Company and the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad have been using lightweight cars for some time equipped with 24-in. wheels with satisfactory results. On the former roads three lightweight cars for one-man operation were installed over a year ago and the 24-in. rolled steel wheels at the end of thirteen months continuous service showed but little wear, and in this time it has not been necessary to remove a wheel. The power consumption for these cars has been but 1.1 kw.-hr. per car-mile and the general maintenance has also been very low. The Cincinnati, Lawrenceburg & Aurora was also getting about the same results. After witnessing the demonstration of the new lightweight cars recently purchased by the Kentucky Traction & Terminal Company, Mr. Gunn stated that he was very enthusiastic over this type of car and expressed himself as being in favor of the 26-in. rolled steel wheel under this type of car.

J. F. Collins, Michigan United Railways, said that he had had no trouble whatsoever from 26-in. wheels under Barney safety cars. In regard to safety cars in general, agreements on several other points were reached, and the meeting as a whole favored double-end control for one-man cars. The question of whether or not one or two tilleys should be carried on the Bir-

ney and similar types of cars was settled in favor of one pole.

The conclusion reached was that the 24-in. wheel was thought inadvisable on account of the close clearance after wear followed by turning, but all agreed that the 26-in. diameter wheel was entirely satisfactory and practicable. The council accordingly recommended its use under lightweight interurban and city cars.

STEEL WHEEL FLANGES CAN BE REPAIRED BY WELDING

The discussion on the practice of building up worn flanges on rolled steel wheels by electric welding was rather limited. Mr. Gunn and Mr. Heckler were the only members present who had done this work on wheels in use on interurban cars. Mr. Heckler remarked that with one pair of welded interurban wheels he had had good success, but owing to local conditions it was too expensive a practice to follow. Mr. Gunn, in relating his experience with the Lincoln machine for building up flanges, stated that he had been doing this work for the past three and a half years with excellent success. In this time only three wheels have shelled. The machine is used on the regular trolley voltage, but some trouble is experienced from the voltage fluctuation. He is contemplating installing a direct line from the substation to the shop to eliminate this drop. Mr. Gunn attributed his success largely to the care and skill of his welder and he is also of the opinion that the type of machine he is now using is the best for this work. The maximum wear is obtained by placing the welded wheels under freight trailers after they have been taken from motor car service. The Western Ohio Railway is not only welding its own wheels but has also built up a number of motor car wheels for the Dayton & Troy Railway and the Dayton & Western Railway. No recommendations were made on this subject because experience in this line had been confined to a limited number.

THE SLIDING SHOE VERSUS THE TROLLEY WHEEL

A number of interesting points were brought out on the relative merits of sliding contact shoes and trolley wheels. Mr. Rankin, Community Traction Company, said the experience of his company was limited in this respect, but foreign cars entering Toledo were having trouble with the dewiring of sliders because it was almost impossible to adjust switch pans for the accommodation of both wheels and shoes. It is not feasible to use both types simultaneously on the same overhead system. Mr. Savage, Detroit United Railway, remarked that a steel

sliding shoe of the company's own pattern and manufacture was being used on the entire system with the exception of one division. When worn out these shoes are scrapped, since they can be produced cheaper than they can be reclaimed. In two-car operation their life averages from 1,300 to 1,800 miles, while a trolley wheel in the same service gave about 400 miles. When using the slider, the trolley pole tension is adjusted between the limits of 15 and 20 lb. The practice of regularly greasing the trolley wire where the shoe is used has been found helpful in facilitating backing up and lessening the wear on both the slider and the wire.

On the Northwestern Ohio Railway & Power Company lines E. E. Johnson said the Chapman sliding shoe was being used with good success, the life of which averaged about 6,000 miles. Mr. Shyrock of the same company added that the use of this shoe had reduced overhead maintenance by about 30 per cent and had not caused any trolley breaks since its installation on all equipment has been complete. It is also the practice of this company to assist the slider in backing up by greasing the wire at the regular meeting points of cars.

There was general agreement that interurban roads would adopt the sliding contact shoe for all their equipment when the manufacturers are able to bring out a shoe that will meet all requirements, particularly that of successfully backing.

SPECIAL BEARING METAL GIVES GOOD RESULTS ON WESTERN OHIO

Following the discussion of the assigned topics, Mr. Gunn related his experience with the United Lead Company's Frary metal. The Western Ohio Railway installed four of these Frary metal bearings for test purposes in a passenger motor car on July 25, 1921. After making 40,000 miles each one had lost approximately 3 oz. in weight. Even with considerably less oil than is required by regular babbitt bearings, these bearings kept the axles polished and in good condition. In a 1,000-mile test run without any lubrication whatsoever, he said that the metal did not melt and run out but powdered out. After testing a few bearings of this type Mr. Savage said that he had ordered some fifty more for the purpose of making his test more conclusive. He was of the opinion that the use of this bearing metal would wipe out their bearing trouble entirely.

Helical gearing also came up for comment. The subject was closed with the general conclusion that helical gears had no particular advantage over the older type, and in fact a number of the representatives showed preference for the straight spur gears and pinions.

In response to an inquiry by one of the representatives as to the average rate at which bonds could be installed, it was brought out that one type of machine operated by a crew of three men had a capacity of about sixteen bonds per working hour. It was the

experience of Mr. Gunn that about seventy-five bonds could be placed in a day by one operator using a Lincoln type bonder and welder on a push car. When using a freight or passenger car the train crew assisted in the work so that an average of from 300 to 350 bonds per day could be installed.

Rail Cars Finding Place on Steam Railroads

New York, New Haven & Hartford
Official Gives Operating Experience—Three Cars Now Making
Almost 350 Miles Each Day

IN a paper on Australia and its railways, F. M. Whyte, at the February meeting of the New York Railroad Club, explained that motor cars with internal combustion engines were being used there successfully on lines of light traffic. Such cars seem to be favored for service on outlying sections where traffic is not only light, but where fluctuations in demand are not wide.

The need for extensive experimental development in the rail car was pointed out by W. L. Bean, mechanical assistant New York, New Haven & Hartford Railroad. Mr. Bean said that the automotive industry must venture considerably and be willing to develop vehicles of greater capacity, speed and comfort.

Three rail cars are now operated on the New Haven property, with the results shown in the table. One of the cars, which seats thirty-five passengers, went into service Jan. 3, and makes two round trips on a branch 15 miles long. The speed between terminals, including three stops, is 25 m.p.h. The average of 1.2 minutes delay per trip is considered not excessive for breaking in a piece of equipment of radically new design, especially in midwinter.

The second car is operating on runs which require speeds on various schedules from one end of the line to the other from 19 to 23 m.p.h. This car runs, with frequent stops, over grades up to about 1 per cent for considerable stretches and over a very crooked line.

A third car went into service on Jan. 3 and until Jan. 30 made only about 20 miles a day. Since then it has averaged 146 miles a day, on schedules that range from a speed of 20 to 26 m.p.h.

In concluding, Mr. Bean said that the New Haven experience gave its officials confidence that there is a large economy available through gasoline rail equipment. The development should be rapid and along good engineering lines in order that there may be no serious setback and that no one gets loaded up with unsatisfactory equipment. The need for unit cars is impressive, particularly on branch lines, where engines are kept under steam, frequently from one washout period to

RAIL CAR OPERATING DATE, N. Y., N. H. & H. R. R.

Operation Started	Average Daily Mileage	Average Operating Speed, M.P.H.	Total Train-Miles	Average Delay Per Trip, Min.	Passenger Data			
					Total	Average	Per Trip Max.	Min.
January 3.....	146	20-26	2,661	1.2	4,443		73	10
January 18.....	60	25	1,497	1.2	2,118	21.2	38	3
January 30.....	137	19-23	...	0.4	1,467	27.2	66	10

another, and only make 30 or 40 miles per day. The field of economy is great if a rail car can be developed that will compare with a motor truck on the highways in reliability, in the saving

in fuel, in the saving in wages and in the saving in attendance other than operating wages, to say nothing of possibilities in maintenance cost reductions.

Difficulties Confronting Electric Railways in California*

Short Franchises, Heavy Taxation, Paving Burdens and Unfair Automobile Competition Delay Electric Railway Development—Public Opinion Becoming More Favorable to Electric Roads

BY W. V. HILL

Manager California Electric Railway Association

THERE are thirty-four electric railway companies in California operating 3,140 miles of single track with 5,736 cars and employing 17,544 men. The investment in these properties is approximately \$350,000,000. Their gross receipts in 1920 were close to \$50,000,000, and their deficit for that year was \$1,244,337, according to the report of the Railroad Commission. During 1920 they carried 624,991,946 passengers. California ranks fifth in point of mileage, cars operated and passengers carried on electric railways.

When the electric car replaced the horse car it succeeded to all of the obligations incurred by its predecessor with compound interest, including the obligation to pave and repave the tracks and for 2 ft. on each side thereof. With the advent of the automobile and trucks, the expense of track construction has grown from \$5,000 a mile during the early days to \$143,000 per mile in some of the cities in California. Notwithstanding the tremendous increase in this and in all other costs of operation, the little old nickel carfare that was charged thirty years ago is still doing duty in San Francisco and on one of the lines in Los Angeles.

FRANCHISES ARE BURDENSOME AND SHORT LIVED

With the exception of Oakland, the franchises in the larger cities are limited to from twenty to twenty-five years. In San Francisco the city reserves the right to take over the property without payment therefor and has taken over some of the lines and paralleled others. In Los Angeles the city agrees to pay for the property if it desires to take it over at the expiration date. You can appreciate the difficulties of financing a property of forty or fifty-year bonds with franchises that run about one-half of the life of the bonds and with all the uncertainties that are liable to arise, and have arisen, at the expiration thereof.

In addition to the paving charge,

there are other obligations in the franchise. They vary somewhat to meet local situations, but the more important provisions are contained in all.

Take Los Angeles for example: Twenty-one year limitation; right of city to purchase; may grant extensions of three years; grantee must pay 2 per cent of gross receipts to city (this in addition to state tax of 5½ per cent); grantee must carry free on cars city officials, policemen, firemen and mail carriers (free rides on the Los Angeles Railway amounted to 4 per cent of the total travel in 1920); grantee must use heavy girder rail and track construction, including paving, in accordance with plans and specifications of the City Engineer; grantee must give transfers to all lines operated, and a 5-cent fare is stipulated. The Railroad Commission, however, has been vested with jurisdiction over fares. There are requirements to build culverts at street intersections where curve tracks are constructed; there are restrictions as to the kind of cars used, the service performed, the hours service must be performed and many other minor restrictions. These are a few of the requirements to which a company must agree when it accepts a franchise to operate an electric railway.

Is it surprising that the electric railways have failed to keep abreast of the development of this wonderful state? I think I speak conservatively when I say that there should be 5,000 miles of electric lines in operation in this state today properly to care for the transportation needs of the people.

There should be a drastic change in our system of granting franchises and this power should be vested in the State Railroad Commission. It is too large a problem for the average city hall politician to handle; it is a state problem. For after all most of the electric railways operate in more than one city. The Pacific Electric, for instance, operates in fifty-two incorporated cities and towns. Just imagine conforming to the different franchise requirements of these municipalities. It reminds me of the conflicting ordinances in Los An-

*Abstract of address presented before California Real Estate Association, Los Angeles, March 25, 1922.

geles and Pasadena relating to smoking on cars. A passenger wanting to smoke on a car operating in and between these cities is required to start smoking on the front end in Los Angeles and go to the rear end when reaching Pasadena. I expected South Pasadena to require smokers to sit in the center of the cars, for they never could agree with Pasadena or Los Angeles on anything as a rule. The Railroad Commission now has jurisdiction over fares, rates, service, finances, accounts, extensions and abandonments of electric lines, and in order to work out these important problems it should have jurisdiction over the granting of franchises, for after all the franchises are the foundation of the structure, and unless that is made secure it will be impossible to finance further extensions, and the officials responsible for these properties have already come to the conclusion that they cannot hope to place them in a sound financial condition and render adequate service to the public until the franchise problem is remedied.

BUS AND AUTO TRUCK COMPETITION IS SERIOUS

While the large number of privately owned automobiles are responsible to some extent for our loss of revenue during the past six or seven years, yet we do not feel we have any grievance with this class of competition, for the highways and paved streets were built by the taxpayers for this kind of traffic.

On the other hand we have some 800 companies and individuals operating about 2,500 large buses and trucks as common carriers over these highways (which we are being taxed to help build and maintain), doing a business estimated to be close to twenty millions annually—or about one-third of the gross business of the electric railways—destroying these highways without paying anything in the way of rental or taxes therefore, excepting a pittance of a motor vehicle tax, and nominal licenses imposed by less than 10 per cent of the cities and counties in the state. Of all the impositions ever placed on an industry, I consider this the worst. C. A. Whitmore, a member of the State Highway Commission, in a recent speech, clearly expressed the situation when he said:

A peculiar paradox exists in California. We raise the money to meet highway bonds and interest from taxes on railroads and public utilities. With this money we build highways which are now used by automobile transportation lines in competition with the railroads. The competition reduces the revenues of the railroads and reduces the income which accrues to the state, with a part of which it builds highways. The state furnishes almost free a roadway for one common carrier out of money provided by taxation of another. Obviously this situation cannot continue. Highways cannot be maintained under circumstances like these.

Mr. Whitmore also stated that it was costing about double the amount per mile to care for the 5 per cent (trucks and buses) of the vehicles using the highways. In other words, they could build highways for \$25,000 a mile that would withstand the traffic of 95 per cent using them, but it would cost \$55,000 per mile to build highways that

would withstand the other 5 per cent of the traffic.

The Highway Commission in its last report said: "The chief need for the heavier duty highway comes from the truck and auto passenger traffic. We believe that present laws should be amended to place a larger burden of maintenance cost on this particular class of traffic."

PUBLIC SENTIMENT CHANGING

A feeling is growing throughout the state that we have been given a raw deal by the taxpayers subsidizing our competitors with a free right of way and the non-payment of state taxes, and if this sentiment continues to grow, as reflected in more than a hundred editorials appearing recently in as many papers, we have hopes this injustice will be soon corrected. About one-half the county boards of supervisors and numerous chambers of commerce have petitioned the Railroad Commission not to grant any more permits where they compete with rail carriers, for it is now realized by public-spirited men that it has resulted in the impairment of service and in some cases the entire abandonment of lines, and that after all no community can thrive without a dependable transportation service.

So far these bus and truck operators have utterly failed to render as satisfactory service as that performed by the rail carriers, but have taken just enough revenue away from them to make it impossible for the rail carriers to maintain their former high standard of service and meet the demands of the public in making extensions in keeping with the progress of the state's de-

velopment. Until the franchise burdens and the injustice of this subsidized competition are corrected the electric railways cannot hope to board the bandwagon with you again and take their rightful place in the future development of this wonderful state.

Technical League Prospers

THE Technical League of Milwaukee, which is one of the activities of the Employees' Mutual Benefit Association of the Milwaukee Electric Railway & Light Company, and was organized in December, 1919, reports that during 1921 its membership practically doubled. Meetings are held monthly in the Public Service Building, usually preceded by a supper.

During the year, out of seven papers read before the league, five were presented by company employees. The assistant general claim agent discussed the work of the claims department; the general auditor, that of the accounting department; the chemist, that of the chemical and physical laboratory, and so on. Other addresses were given by the local resident engineer of the Wisconsin Railroad Commission and a prominent banker formerly intimately connected with public utility work.

At the annual meeting prizes were awarded to a transportation department man for a paper on "Power Saving as a Factor of the Transportation Department Bonus," and for papers on "Electric Characteristics of the Electric Steel Furnace," "The Three-Truck, Two-Car Train," "My Job and I" and "Essentials of a Service-at-Cost Contract."

American Association News

Way Committee Holds Well Attended Meeting

THE committee on way matters held its second meeting for the year at association headquarters in New York City on March 29 and 30. In attendance were: W. F. Graves, chairman; H. H. George, vice-chairman; R. C. Cram, sponsor; C. A. Alden, V. Angerer, E. B. Entwisle, W. R. Dunham, Jr., C. F. Gailor, E. P. Roundey, E. M. T. Ryder, F. Tingley, W. W. Wysor, G. C. Hecker, E. J. McIlraith, H. M. Steward, W. C. Emory and F. A. Weymouth. The items covered are segregated below by subject assignments:

Standardization of Branch-Off Frogs and Car Clearance Curves—The proposed standardization scheme for branch-off frogs, as submitted in Plan B Appendix A of the 1921 report, was discussed. The general opinion was that this should not be approved. The proposed tables and data for car clearance curves presented last year as Appendix C was approved with addition of a drawing to assist engineers in making selections for varying street con-

ditions. This material will be offered for approval as a recommended design. The tables are to be amplified with data covering the use of clearance curves for tracks of other than standard gages.

Proper Location of Tongue Switches in Turnouts, Crossovers and Branch-offs—Drawings were submitted and approved for adoption as recommended design.

Design of Curved Treads for Wheels and Study of Design of Flange and Tread Contours—These subjects had been combined to facilitate discussion with the committee on equipment. It was decided that a set of three flanges of different heights but uniform thickness be suggested for discussion at the meeting of the equipment committee on April 6. The view was expressed that treads should be at least 3 in. wide and that 2½-in. wide treads should be used only when conditions will not permit a wider tread. A suggested compound tread contour applicable to all treads regardless of flange depths was to be discussed with the equipment committee also. The object of this is to secure a uniform contour of contact

surface, more nearly in conformity with actual conditions found in the contact between worn wheels and worn rails.

Revision of Specifications for Girder Rails in Respect to the Method of Tests and Review of the Engineering Manual—An exhaustive study was stated to have been made of the manufacture of the steel test balls proposed for use with the modified impression test as originally suggested by the A. S. T. M. A slightly revised draft of the modified impression test was approved for adoption in place of the drop test. The manufacturers advised that they would continue to make the drop test or would substitute the impression test. Mr. Weymouth, for the A. S. T. M. sub-committee, stated his belief that the A. S. T. M. would accept the modifications proposed. A suggestion for change in the present specification for splice bars was also presented. The present specification will be set aside and certain A. S. T. M. specifications for splice bars are to be substituted. These cover all grades of hardness from the soft steel desired for use with seam welded joints to the high carbon bars of a nature similar to those provided by the existing specifications.

Designs of Substitute Ties—The sub-committee on this subject reported that it is preparing a statement of the controlling factors of design from data received.

Investigation of Arc-Weld Joints—The committee devoted detailed study to the design of a proposed machine for making an accelerated form of test of these as well as other joints. The manufacturers of welding equipment will be asked to devote their metallurgical studies to the question of the best methods of producing a satisfactory top seam. A statement was made to the effect that the committee on welded rail joints is compiling data from its recent questionnaire. A general meeting of this committee will probably be held late in April.

Wood Preservation—The sub-committee reported that some data from Europe are being gathered on the use of sodium fluoride as a preservative. Papers describing several timber treating plants of member companies are being prepared.

Review of Report of the American Committee on Electrolysis—Under this head there was some discussion of the definition of "stray currents." The matter was assigned for conference with the power distribution committee.

Specifications for Sundry Track Materials—On this subject the committee decided to suggest adoption of the A. S. T. M. specifications for tie plates, track bolts, ordinary hookhead and screw spikes. The specification for tie rods is to be considered further.

Dimension of Frogs—A set of angles and lengths for standard frogs used in turnouts in split-switch and tongue-switch construction was adopted for submission as recommended design.

Design of Track Construction in Co-operation with the A. S. M. I.—The sub-committee reported on correspondence had with a sub-committee of the A. S. M. I. It is hoped to arrange a joint sub-committee meeting soon.

Special American Association Reports and Compilations

THE following list of reports, which are available to members on request, has been issued by Executive Secretary Welsh.

Financial and Operating Statistics: Combined reports of approximately 175 companies showing complete income statement, operating expenses by departments, on various unit bases including operating and traffic ratios.

Motor-Bus Operating Costs: Gives operating figures for Chicago, Washington, D. C.; Lincoln, Neb., and a comparison of the relative costs of operation of motor buses, trolley buses and one-man cars.

Recent Official Valuations: Summary of commission decisions in valuation cases occurring since January, 1921, giving details of values found and the principles followed in determining them.

Fare Changes on Interurban Properties: Gives present fares in effect on interurban lines, changes that have occurred in past year and method of effecting change, i.e., whether by increasing mileage rate, increasing zone rate, rearranging zones or other methods.

Depreciation Decisions: Summary of depreciation rates fixed by public utility commissions. This is a supplement to compilation of the same name issued June 1, 1921.

Metal Tokens: A list of companies using metal tokens, showing size of token and rate at which they are sold.

Printing Transfers: Showing companies that print their own transfers, number printed, type of transfer and cost of printing.

In addition to the above, supplements to the wage bulletin, the fare bulletin and the cost of living studies have been prepared bringing them down to date.

Help the Mail Pay Committee

THE Post-Office Department has recently mailed to all electric railway companies in the country that handle United States mail a series of forms calling for information necessary to enable the Interstate Commerce Commission to decide the petition recently filed before it, Docket No. 10227, by counsel for the committee on mail pay asking for increase in mail pay.

The American Electric Railway Association committee on mail pay has been in consultation with the Post-Office Department on this question, ironing out differences and reaching agreement on the method of procedure and scope of data needed. These efforts have been conducted for the department by Joseph Stewart, special assistant to the attorney general, and former second

assistant postmaster general, and for the electric railways by L. H. Palmer, chairman, and W. H. Maltbie, counsel, of the committee on mail pay. The results are contained in the forms just sent out with a pamphlet of instructions.

Executive Secretary Welsh, of the association, has mailed to all companies copies of the petition filed with the Interstate Commerce Commission and two circular letters of explanation.

As the department desires operating data based on April, 1922, the compilation of the data called for on the forms cannot be completed until after May 1. As soon as possible thereafter, with the prompt co-operative efforts of the railway companies, an analysis and summary of the figures will be made and the case prepared for argument before the Interstate Commerce Commission.

Chairman Palmer states that the mail pay committee expects to develop some interesting and authoritative data on the relation between service provided as measured in seat-miles operated and the ratio of use of same. It hopes to show the costs of providing space for carrying mail both in pouches and compartments so that this difficult question may be solved once and for all. Finally the committee is sanguine that it can prove the inadequacy of the existing rates and the justice of an increase therein. None of these desired ends can be accomplished, however, says Mr. Palmer, without the co-operation of the mail-carrying electric roads in filling out the forms accurately, completely and promptly. Further work must be done in tabulating and analyzing the information after it has been forwarded to the Department and the counsel for the committee.

Merchandising Transportation

A MEETING of the committee on merchandising transportation of the T. & T. Association was held at association headquarters in New York on March 31. Those in attendance were E. M. Walker, chairman, Terre Haute; K. A. Simmon, East Pittsburgh; Victor S. Curtis, New Haven; W. H. Boyce, New Brighton, and J. B. Stewart, Jr., Youngstown, Ohio.

The meeting was devoted principally to deciding on the scope of the report for the October convention.

Busy Days for Committees

DURING the past week the Engineering Association committees on power distribution and equipment each held two-day meetings, largely attended, in New York City. The committee on purchases and stores was also scheduled to meet. Reports of these meetings will appear in a later issue.

Among coming meetings already scheduled is a two-day meeting of the buildings and structures committee, April 10 and 11, at Cincinnati, Ohio, and a one-day meeting of the committee on heavy traction, on April 12, at association headquarters.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Bacharach Bill Opposed

Public Opinion Aroused Over Measure Which Would Curtail Courts' Powers Over Commission Decisions

It would seem from the attitude of members of the judiciary committee of the House of Representatives that there is little chance of success for Representative Bacharach's bill to limit the jurisdiction of Federal courts in matters pertaining to state public utility orders. Still it appears likely that the bill will be vigorously sponsored. A further hearing on the bill will be held April 25.

In explaining the object of the legislation, Mr. Bacharach said:

This bill seeks to amend the judicial code of the United States so as to compel utility corporations dissatisfied with the findings of the state utility commissioners to carry their cases through the courts of the state and then on to the Supreme Court of the United States if necessary. The enactment into law of this bill would not deprive utility companies of any of their just rights for they have every protection afforded them in the high type of men who compose the membership of the higher courts of the various states.

To enact such a bill as that proposed by Mr. Bacharach would be highly injurious to the public welfare, in the opinion of Everett T. Wheeler, of the Jurisprudence and Law Reform Committee of the American Bar Association. Among other things he brought this opinion to the attention of the committee:

We often hear criticisms upon the writ of injunction from those who feel its effects. In my judgment it is just as beneficial and important for the public welfare as the writ of habeas corpus. It prevents parties from taking the law into their own hands and provides for a continuance of existing conditions until a competent court has adjudicated the rights of the parties.

Former Senator Charles S. Thomas, Colorado, says that he cannot conceive of any law that is more iniquitous than the legislation proposed. Mr. Thomas said:

This bill is designed to reach a class of cases which will result from legislation existing or to be enacted in the future that will challenge the application thereto of such provisions of the Constitution as the fourteenth amendment. It seeks to deny to the Federal Courts the right to preserve property and the rights of individuals pending the determination of the constitutional question and thereby in my judgment brings upon the fourteenth amendment.

One of the most able of those who spoke for the bill was Clyde M. Reed, chairman of the Kansas Public Utilities Commission. This was the high point of his argument:

It is not in the interest of public policy for the government to interfere where a remedy has been created under the state law for the benefit of the states laws and the state judicial bodies. If a constitutional question is involved, they can appeal to the Supreme Court of the United States. We have had in Kansas during the last eight or ten years a very large volume of litigation over these questions invoking the state courts and Federal courts and many of these cases have come direct to the Supreme Court of the United States. Usually the state power has been upheld but there has been a very considerable interference in the meantime by the lower Federal courts.

Paul V. Keyser, Des Moines, representing the Investment Bankers' Association of America, said that if the suggested legislation be adopted, it will affect very materially the value of securities already issued and outstanding. In addition, it would have a direct and immediate effect upon the credit of the utilities in respect to all additional capital requirements.

William Chamberlain, of Cedar Rapids, Iowa, representing utility companies in Iowa, Illinois, Indiana, Michigan and Tennessee, said in part:

I think that it would be a serious thing to the finances and to the development of the utilities in the entire middle west to have a law passed which would take away from investors the protection of the Federal courts. I think that the result would be that in the financing of the utilities in the West you would practically drive away many millions of dollars which would otherwise be available for development.

Wage Reduction Accepted

Recently a wage reduction approximating 8 cents an hour for trainmen was placed in effect by the Pacific Northwest Traction Company and the Puget Sound International Railway, operating in Everett, Wash. The Pacific Northwest Traction Company operates the interurban line between Everett and Seattle and the Puget Sound International, the railway lines in Everett.

The old rate of wages paid trainmen by the Pacific Northwest was 58 cents an hour for the first year, 63 cents an hour for the second year and 68 cents an hour for the third year. The new rate is 50, 55 and 60 cents an hour. The present rate of wages on the city traction lines is 48 cents an hour for the first year, 52 cents for the second year and 56 cents an hour for the third year.

These reductions were accepted by the trainmen voluntarily following a conference with executive heads. This schedule prevails until 1923.

Traction Companies Will Save Through Centralized Plant

Power for all railway systems in Dayton, Ohio, soon will be supplied by the Dayton Power & Light Company. All but one of the five Dayton companies have been producing their own power heretofore, and in the case of this one exception, only part of the power was supplied. The Dayton power company some months ago secured a contract by which it will furnish all of the energy for the Indiana, Columbus & Eastern traction line. For a number of years it has supplied the Dayton & Troy, Dayton & Western, Dayton, Springfield & Xenia, and the Springfield and Xenia traction lines. In order to take care of these additional power contracts the company plans to spend more than \$2,000,000 in extensions and improvements.

Election Result Awaited

Municipal Interests Planning Ahead, but Withholding Action Pending the Election

Little interest has been displayed in the railway situation by residents of Detroit, Mich., since the agreement was reached by the company and city officials regarding the purchase plan that will be voted on by the electors on April 17. The street railway officials are awaiting the outcome of the election before proceeding with their plans although little doubt is expressed that the purchase plan will be accepted by the voters.

While no financial statement has been given out for the year ending Dec. 31, 1921, covering the operation of the municipal railway lines, the revenues from operation have been satisfactory to the street railway commission and the municipal officials. The first municipal cars were operated over short sections of lines in February of last year and the first sections were put in operation for service only without the expectation of revenue until the lines were made into a more complete system by connecting the various sections. The crosstown lines have grown in importance until lines that at first showed receipts of only \$200 a day are now producing \$1,300 and \$1,600 a day.

The opening of new city lines has changed somewhat the routes taken by some of the car riders and a study is being made of the traffic conditions with a view to determining future extensions in the way of branch lines and connecting links, to be constructed in carrying out the program of expansion. Schedules have been changed from day to day on certain lines to meet the requirements of the riders as they became accustomed to and used the new routes traversed by the M. O. lines.

While the proposed use of trolley buses in connection with the municipal system has not been abandoned, the commission has decided that no further steps will be taken to establish trolley bus lines until the more important problems pertaining to the main lines have been worked out so as to make the need of buses more evident. The idea of using buses has not been abandoned and new developments of importance are looked for in connection with trolley bus equipment. Gas buses are not looked upon with favor by the commission as it is believed that under the existing conditions on the lines contemplated gas buses could not be operated satisfactorily on a 5-cent fare. As noted elsewhere in this issue the municipal railway is preparing specifications for 200 Peter Witt cars with the idea of buying this new rolling stock if the city takes over the D. U. R. lines.

Scores City Jurisdiction—Commends State Regulation

N. W. Simpson, member of the Missouri Public Service Commission, in a speech delivered before the St. Louis Rotary Club on March 9 declared that if the people of St. Louis insisted upon a cut in electric railway fares, which are now 7 cents, they would have to "stand up for a slash in wages." He said that not only should the public utilities be permitted to earn a reasonable return on their invested capital, but they should also be allowed enough money on which to operate.

Mr. Simpson referred to the old days when politics played so important a part in readjustments, when a man who was running for office did so on the promise that he would have fares cut or gas rates reduced. He said that the commission had ended all this. Mr. Simpson said in part:

When the cities controlled public utilities they did not do it properly. State supervision was the answer. Would the United Railways have so large an amount of stocks and bonds outstanding against it today if the State had been supervising its operations? Franchises cannot cover the relations of the utilities with the public. The commission is needed.

The public is woefully ignorant on questions in which public utilities are involved and the cities were decidedly recreant to the trust placed in them. This trust never will be returned to the cities unless there is some absolute assurance that the control will be exercised judiciously.

The hardest work the commission has to do is to undo the bungled job that the cities did when they controlled utilities. Trying to untangle these knots has put gray hairs in my head. The utilities want more money, the public wants lower rates and the investors want more dividends.

Commissioner Simpson flayed the city press for its misinformed criticism of the utilities. He said he had just read an editorial on a subject on which he happened to be well posted, and he found that the editorial writer knew nothing about the subject. He said that he suspected he was the man who had been writing certain other utility editorials.

Wage Controversy Settled

A wage agreement has been signed by the East St. Louis & Suburban Railway, East St. Louis, Ill., and its many members of the Amalgamated Association, ending a controversy that has lasted for a year and litigation which has been in the federal courts for several months. Under the contract the men get 51 cents an hour, until May 1, 1923. This is the same rate of pay they have been receiving pending the settlement. Up to July 1, 1921, the men received 70 cents an hour.

The employees demanded 65 cents an hour. After the men submitted their demand a board of arbitration was named. The arbitrator representing the company resigned before the board rendered a decision. The company then obtained an injunction restraining the board of arbitration from rendering a binding decision, as it attempted to do through the two remaining members, the union's agent and a third party. Since the injunction was granted the

employees have been working at 51 cents an hour, and the contract just signed by President W. H. Sawyer, continuing the scale for thirteen months, has been ratified by the union.

Transportation Commission Reports

Sees Bright Prospect for San Diego Property—Transportation of Passengers Necessary Part of City Building

Declaring that the San Diego (Cal.) Electric Railway has a bright future if properly managed, and condemning some of the practices in the past of the company, the citizens transportation commission of San Diego appointed last fall by Mayor John Bacon, made its report to the City Council on March 27. Among the more important recommendations made in the report were suggestions that the city create a Public Utilities Commission, consisting of three members, one to be a paid executive, to supervise operations of all public utilities, but especially transportation; the consolidation of all transportation lines into one company; discontinuance of the 2 per cent municipal franchise tax; relieving the company of obligation to pave between car tracks after 1930; and that the company begin reconstructing its lines without delay. The commission also takes a stand against the zone system of fares, recommending that the 5-cent fare for all points between the bay and the eastern boundary of the city be restored as soon as the company's earnings justify.

A change in management of the company was recommended, which recommendation, the commission added, had already been complied with. The commission also opposes the plan whereby the J. D. & A. B. Spreckels Securities Company, owner of the railway company's stock in exchange for 2 per cent of the gross receipts, furnished the railway's operating and accounting staff.

The commission report says that the San Diego Electric Railway lost \$15,000 in operating the Point Loma Railway in 1920, and broke even on that line in 1921. The San Diego company operates the Point Loma company's line at a rental of 10 cents per car mile and normal maintenance, for use of track and trolley. The commission also thinks the railway paid excessive charges to the San Diego-Coronado Ferries company when it paid \$12,000 in 1921 for use of terminals at both shore approaches to the ferry. Both the Point Loma company and the Ferry company are owned by the Spreckels.

The commission commends the use of one-man cars for light traffic, and recommends the use of the auto bus for furnishing transportation to districts not sufficiently populated to justify the laying of tracks.

"Transportation of our people is as necessary and integral part of city

building as gas, water, sewer, police and fire station service," the commission report states, and recommends that the interest of the city in the welfare of the company should not be sporadic or occasional, but constant, constructive, energetic and reasonable. The report says:

These companies demand security for their investments and a fair return on interest. This is as it should be, but the other equation is the city's right to demand the greatest degree of efficiency and economy in the conduct of that business. The people should know that the men administering these public trusts are capable and honest and serving the public no less zealously than the stockholders. In the last analysis their masters are the people and the stockholders jointly and equally.

The commission pointed out that any extravagance in management, any waste, or any franchise tax or paving charge against the company, meant a higher fare to the commuters. The commission declared that the San Diego system is helping to pay for the building up of Tent City (Coronado line) and Ocean Beach (Point Loma line) resorts, and that this is unjust, and a fare should be charged on these lines to make them self-sustaining, thus aiding toward a lower fare on San Diego city lines.

\$75,000 Saved by Want Ad

Car riders were saved \$75,000 by a "want ad," according to officials of the Cleveland (Ohio) Railway, which has just won a damage suit for this amount.

The "want ad" was used to get information about lapses of consciousness suffered by Mrs. Helen Bachman, 5600 Hough Avenue, N.E., who sued the company for \$75,000 as the result of an accident in which she was squeezed by the door of a Wade Park car on March 20, 1920.

Mrs. Bachman, who was wheeled into court, maintained that her condition is the result of the accident. During the trial Mrs. Bachman submitted to "pain tests," in one of which a bandage was slipped from her head, and she showed no sign of emotion when a doctor drove a needle into her arm. As soon as the bandage was replaced, she became apparently fully conscious.

After an article appeared, telling of the "pain tests" in the court room, one of Mrs. Bachman's neighbors reported to Cleveland Railway officials that Mrs. Bachman had suffered in a similar way before the accident.

The company placed a "want ad" in a newspaper asking for information from other persons who knew of Mrs. Bachman's condition. Several appeared in response to the "ad" and testified that Mrs. Bachman had suffered lapses of consciousness prior to the accident. The jury returned a verdict in favor of the company. The case was heard before Judge Maurice Bernon.

"That little 'want ad' saved the street car riders of Cleveland about \$75,000 to apply on the fund that will help reduce the present rate of fare," says Paul E. Wilson, secretary of the Cleveland Railway.

Agreement Being Drawn to Provide Trackless Trolley

Counsel for the United Railways & Electric Company, Baltimore, Md., and for the Liberty Roads Improvement Association are preparing a formal agreement regarding the trackless trolley service from Gwynn Oak Junction to Randallstown. The association has notified the United Railways that the fund of \$32,500, required by the company to protect it from operating at a loss during the first five years, had been raised.

As soon as the agreement is signed, the company will set about securing the necessary licenses and franchises, ordering the buses, and erecting the poles and wires. Three trackless trolleys will be purchased.

Under the agreement the residents of the section will guarantee the United against loss up to \$10,000 during the first year of service, \$7,500 during the second, and \$5,000 during the remaining three years. By that time it is hoped that the territory will be sufficiently developed to support the line. A 14-cent fare will be charged on the line, and there will be no transfer privileges.

\$575,000 Program of Improvements for Tampa

Increase of the Tampa (Fla.) Electric Company's capital stock from \$2,879,800 to \$3,454,800 to provide funds with which to finance extension and improvements to its property is proposed and a meeting of the stockholders will be held in Tampa on May 2 to ratify the decision of the board to go ahead with the improvements and to increase the stock for providing funds. Altogether \$800,000 will be spent by the company in new construction, improvements and extensions, according to T. J. Hanlon, Jr., manager. Improvements include:

Construction of additional trackage on the Nebraska Avenue line to permit increased service. This is to include double-tracking of certain parts of the line so that ten cars may be operated on it. Additional turnouts and double tracks are to be installed in Jefferson Street from the county jail to Nebraska Avenue.

Track changes on the Union station line to permit of Birney car operation. This will include double track in Seventh Avenue from Twenty-second Street for a considerable stretch and will permit cars to operate on an eight-minute schedule during rush hours. In addition approximately 1.5 miles of new track will be laid on various lines about the city, double tracking present lines.

Purchase of twenty single-truck Birney cars for use on the Ross Avenue and Union station and Ballast Point lines, and for additional rush hour use on city lines. Ten of the new cars are to be delivered in July and the other ten in October.

Purchase of four double-truck cars for the Port Tampa line.

Additional storage and repair facilities to take care of this new rolling stock.

Establishment of substations in Gary and Sulphur Springs from which the supply of electrical current will be distributed.

Installation of a 600-hp. boiler and boiler accessories, pumps, etc., at the West Jackson Street power plant, which will make a sixth power unit at this plant.

Construction of a new store room and employees' room on part of the vacant property at the West Jackson Street plant.

One of the most important features of the program of improvements is the plan to place underground the light and power wires and cables leading from

the east cable house at Whiting Street to remove danger of interruption of service from high water in the cable house or from fires in the lower down-town district. This item will cost approximately \$300,000.

Labor Statistics Published

The *Monthly Labor Review* for February, 1922, contains a summary of a report by the Joint Commission of Agricultural Inquiry, which was created during the summer of 1921 to investigate agricultural conditions in the United States. According to the summary the inquiry covered "the condition of agriculture and the factors which caused it, the adequacy and effectiveness of the credit machinery and resources of the country transportation and marketing and distribution." A

Year	Current Money	Value at Prices of 1913	Index of the Purchasing Power of Annual Earnings, Base, 1913
1909	\$623	\$653	96.3
1910	638	653	96.3
1911	641	652	96.2
1912	652	656	96.8
1913	678	678	100.0
1914	683	676	99.7
1915	666	647	95.4
1916	732	665	98.1
1917	790	613	90.4
1918	878	556	82.0

comparison is made of the average annual earnings of employees usually engaged in several of the leading industries in the United States for the years from 1909 to 1918, a comparison also of the value of these earnings at the prices of 1913 and their relative purchasing power. Included in the table are the following statistics on the average annual earnings of employees normally engaged in the electric railway, light and power, the telegraph and telephone industries.

Augusta Matters Unchanged

The situation in Augusta, Ga., has remained practically unchanged since the Augusta-Aiken Railway & Electric Corporation took its cars from the streets on March 16. The City Council at its last meeting referred the matter back to the committee on traffic and transportation. It appears now to be generally recognized that affairs are reaching a point where some constructive action will have to be taken soon.

Efforts have been made by city officials to regulate the jitneys, which are now the only means of transportation. There is some dissension among the jitney operators themselves in regard to the present situation.

Will Investigate Monthly Pass.—The Public Utilities Committee of the City Council of Seattle, Wash., has asked Superintendent of Railways D. W. Henderson to investigate the success of the monthly pass system in use on the Youngstown (Ohio) Municipal Railway.

Progress Seen in Trackless Trolley Plan

Such progress has been made in adapting a Brill trackless trolley for the Minneapolis (Minn.) Street Railway that the starting of its use on the Bloomington Avenue line from Thirty-eighth to Fortieth Streets is expected about April 15. Some of the changes made for the Minneapolis car, which is likely to be standard hereafter due to the logic of the development is a 36-in. wheel instead of 34-in., thirty seats instead of twenty-eight, one steel trolley pole instead of two of wood, a track shoe by which the car may be operated back to the company station from the end of the line.

T. Julian McGill, vice-president of the railway, believes from experiment that a trackless trolley must be constructed so that it will fit into all operations of the trolley system, otherwise it will be a mistaken policy to adopt use of such equipment. This car may be operated at a maximum of 12 ft. from the tracks in operation over the regular trolley routes back to the station, where emergency may require a detour to be made to avoid an obstruction.

The steel trolley pole with twin wheels to fit the double wire is believed to be an improvement of the original plan for a double wood pole. The company is operating successfully a motor bus as a crosstown line from the end of the Second Street line N.E. to the end of the Fremont Avenue line N., intercepting the Camden place line en route.

Plan for Removal of Traffic Danger Suggested

Los Angeles, Cal., will be 3½ in. above the danger mark in traffic accidents if the plans of a member of the Greater Los Angeles traffic commission are adopted. These plans are now in the hands of the commission for investigation. They provide for safety "islands" 3½ in. above the street, 30 ft. long, and surrounded by 18-inch lamp posts. These "islands" would be placed at each street intersection where cars stop, and would eliminate the possibility of automobiles driving into the space designated by the traffic department for boarding street cars. Another plan involves the erection of curbs 6 in. high at street intersections, running parallel to the direction of traffic, to guide four streams of traffic, two in each direction. This plan, if adopted, would eliminate the possibility of autoists crowding into streams four and five abreast and imperiling lives of pedestrians who must use the street intersections.

Los Angeles now has from 80,000 to 100,000 automobiles tributary to the congested district, and the registration for 1922 in California exceeds 700,000 automobiles, and it is estimated at least one-fourth of these will be seen on the streets of Los Angeles.

Taxpayers' Appeal Taken Under Advisement

Seattle's Municipal Railway controversy came one step nearer settlement recently when the Supreme Court of the State took under advisement the appeal of the "fourteen taxpayers" in their suit to enjoin the city from invading the general tax fund for operation and maintenance of the railway. The case was heard by the Supreme Court, en banc. Attorneys for the taxpayers contended that the city was under no obligation to tax the city generally for operation and maintenance of the street railway or to retire the \$15,000,000 bonds which the city gave for the purchase of the system; that the city had no power to levy a general tax for such purpose, but that it was intended to tax by directing a portion of the general fund to the operation and maintenance of the railway. Counsel for the city of Seattle contended that the city was under no obligation to tax, but that it has the power to tax, although it has no intention of so doing.

George T. Donworth, appearing as a friend of the court, a citizen of Seattle and of the State of Washington, argued that the statutes and the constitution provided against the creation of a general indebtedness for the operation of the street railway system except by popular vote, and that no such vote had been held in this case.

Plan to Resume New Orleans Negotiations

Security holders of the New Orleans Railway & Light Company, New Orleans, La., are ready to proceed with a settlement of the company's troubles on the same basis proposed last November. This was the declaration of C. C. Chappelle upon his arrival in New Orleans to represent the security holders. He will be followed in a few days by G. M. Dahl, vice-president of the Chase National Bank, and a final settlement of the problem is expected to be reached shortly after his arrival.

Mr. Chappelle is quoted as follows:

The city of New Orleans and its people are to be congratulated that the recent decision of the Supreme Court of Louisiana establishes home rule in reference to regulation and control of its local public utilities.

The city now has full power and authority to dispose of its utility problems upon constructive and permanent lines.

I am here to co-operate, as in the past, with the Commission Council to reach an understanding whereby the New Orleans Railway & Light Company can be reorganized into a new concern—a New Orleans institution, which can be financed and kept financed through the years to come, adequately to serve the public at reasonable rates.

We were in substantial accord when negotiations were interrupted last November, upon all matters vital from the city's standpoint—valuation, rate of return, limitations upon the issuance of securities, and upon disbursements to existing securities—hence, it would seem matters should be concluded speedily.

An enormous amount of legal routine and detail is necessary to bring about a reorganization. Therefore, an early and definite understanding between the city and the security holders as to the basis is essential to real progress.

The security holders, who will undertake the responsibility of reorganization, are ready to proceed and I have taken matters up with Commissioner Maloney.

The arrival of G. M. Dahl, vice-president of the Chase National Bank, in New Orleans, La., is being anxiously awaited by the members of the Commission Council so that the conference which was interrupted by action of the Supreme Court last fall may be resumed. The members of the Commission Council are ready and willing to begin where they left off in the conference as soon as it is agreeable and convenient for Chairman Dahl to do so. Meanwhile, however, all sorts of reports are afloat. The chief of these is that the Commission Council will oppose the rate of return of 7½ per cent on the valuation fixed by agreement and will insist on a lower rate of interest.

It may be stated authoritatively that these rumors are misleading. The only objection that has been voiced against the rate of return has been that of Mayor McShane, who has called upon the railway for certain data upon which he is alleged to base his opposition to the points already agreed to by the conferees. The other members of the commission are noncommittal and disposed to deal as fairly with the railway as they are with the public in general.

News Notes

Approve Queensboro Subway.—Committee of the whole of the Board of Estimate of New York, N. Y., has approved the tentative proposal for an appropriation of \$4,000,000 for the Queensboro subway from Grand Central station to Eighth Avenue and Forty-first Street.

Company Claims Damages.—As a result of the Nova Scotia Legislature adopting the bill changing the "drive to the left" rule to "drive to the right," the Nova Scotia Tramways & Power Company, Halifax, N. S., has claimed compensation to the amount of \$50,000. It is said this amount is necessary to change tracks, cars and snow sweepers.

Investigates Grade Crossings.—Investigation of grade crossings in Tiffin, Ohio, was ordered by the City Council on March 14, upon petition of a large number of residents. Safety Director George T. West was directed to probe conditions following complaints that rail crossings are left unguarded where there are no gates.

Examinations Announced.—The United States Civil Service Commission announces an open competitive examination for tax examiner specialist. The salary for this position ranges from \$2,400 to \$3,600. Receipt of applications will close on May 9. The commission also announces an open competitive examination for transitman on May 10.

Paving Suits Threatened in New York.—Borough President Julius Miller of Manhattan has disclosed that suits aggregating about \$150,000 probably will be brought by the city of New

York against the various traction companies operating surface lines to compel these corporations to pay for repaving and other repairs within the railroad area.

Meets on Wage Matter.—At Lima, on March 27, there was a meeting between B. J. Jones, receiver for the Ohio Electric Railway, which operates the Lima City Railway, and W. P. Anderson, J. C. Hutchinson and John Sweeney, arbitration committee appointed to adjust wage scale differences between the men and the company. A working agreement adopted last fall continues until August, but the wage scale terminated on Feb. 15. The men oppose a further cut in wages and ask for a slight increase. The committee ruled against any change.

Third Arbitrator Selected.—Professor George W. Rightmire of Ohio State University, Columbus, Ohio, has agreed to serve as the third member of the board of arbitration which is endeavoring to settle the wage dispute between the Indiana, Columbus & Eastern Traction Company, Cincinnati, Ohio, and its employees. The other members of the board are C. W. Rich, Springfield, who was selected by the trainmen, and S. F. Hutchins, Columbus, selected by the company. These two agreed on Mr. Rightmire for the third member. The first meeting of the full board will be held at the company's office in Springfield on April 13.

Crews, 100 per Cent on Safety, Praised.—The Co-operative Welfare Association of the Louisville Railway and the Louisville Interurban Company gave a dinner and entertainment in honor of the motormen and conductors of the Brook Street car line who went through the month of February without a single accident. The festivity took place at "Safety Hall" at the Eighteenth and Walnut Streets carhouses. James P. Barnes, president of the railway, praised the efforts of the men and said that they were keeping up their good work for in the twenty-one days of March these same men had run 9,668 miles without an accident.

Fort Smith Awaits Settlement.—Meetings between the executive committee of the men and D. C. Green, general manager of the Fort Smith Light & Traction Company, Fort Smith, Ark., have brought no concessions whatever from either side. The company is standing firm on its proposal of a separate contract for powerhouse men and trainmen; a cut of 6 cents an hour in the basic scale for carmen, and an additional cut of 3 cents an hour for swing run carmen; and the existing scale for powerhouse men and carhouse mechanics. The men are holding out for their original propositions: First, the same joint contract that has been in effect; second, the same contract, with a provision that any change in car fare would automatically open the wage scale to negotiations; and third, arbitration of the whole matter.

Financial and Corporate

Rental Agreement Proposed

As Result of Court's Aid Readjustment
Between I. R. T. and Elevated Will
Go Before Security Holders

A tentative agreement has been reached between representatives of the Interborough Rapid Transit Company, New York, N. Y., and the Manhattan (Elevated) Railway which provides for a reduction in the 7 per cent dividend paid by the Interborough on \$60,000,000, the fixed value of the Manhattan elevated lines, to 3 per cent for the fiscal year beginning July 1 next, 4 per cent for the succeeding fiscal year and 5 per cent thereafter. If the earnings of the Interborough system, subway and elevated lines, yield more than 4 per cent, the excess is to be divided between the two companies until the Manhattan again receives 7 per cent.

The agreement also provides for sacrifices by the Interborough. Its stockholders are to subscribe for \$7,000,000 of new Interborough notes, and its bondholders are to waive the sinking fund charges to retire \$160,000,000 of bonds. This waiver, which is expected to give the Interborough an additional \$2,000,000 a year, the reduction in the Manhattan dividends, the money from a new issue of notes and other money to be gained by economies and new devices, will supply the Interborough, it is estimated, an average of \$5,000,000 a year for five years. The Interborough has indicated that this sum would be needed to meet expected orders of the Transit Commission for increased service.

The agreement was the result of intervention by Federal Judge Julius M. Mayer, who appointed James R. Sheffield a trustee in bankruptcy of the Interborough Consolidated Corporation, the holding concern of the Interborough, to act as mediator.

The announcement that the Interborough would not continue to pay 7 per cent dividends to the Manhattan Company and the passing of two quarterly dividends aggregating \$2,100,000 led to conferences between representatives of the Interborough and the Manhattan. No progress was made toward reaching an adjustment that would save the Interborough from a receivership. Two applications for a receiver have been pending before Judge Mayer and the time for their disposal was near.

Judge Mayer took charge of the matter in an extra-judicial capacity for the purpose of bringing the two groups together. The agreement must have the indorsement of the security holders of the two companies.

While the Interborough directors were trying to meet the financial difficulties of the company, Mayor Hylan introduced in the Board of Estimate a resolution calling upon the Transit Commission to declare the Interborough in de-

fault of its contract on the ground of inadequate service and to seize and operate the subways. The resolution also authorized Corporation Counsel O'Brien to proceed independently, presumably in the courts, if the Transit Commission did not comply with the board's mandate. The resolution, on motion of Comptroller Charles L. Craig, was referred to the committee of the whole for consideration.

The Interborough has also obtained a further extension upon the two applications for a receivership, one by the American Brake Shoe & Foundry Company and the other by the Continental Securities Company, the latter a minority stockholder action. The litigation involves an issue of \$38,144,400 short term notes. Counsel for the Interborough said that only \$721,000 of these notes had not been deposited for extension and Judge Julius M. Mayer of the United States District Court extended the time until April 28. He coupled with this order an additional order that any party in interest might apply for a receiver on an hour's notice.

Receiver Submits 1921 Report

Receiver O'Keefe of the New Orleans Railway & Light Company, New Orleans, La., has furnished Commissioner Maloney of the Department of Public Utilities with a report of the earnings for the twelve months ended Dec. 31, 1921. It makes a very good showing for the last three months of the year, when the population of tourists and winter residents was at its greatest.

The railway operating revenue for the year ended Dec. 31, 1921, was \$8,845,876 and the expenses amounted to \$5,790,269. The net operating income amounted to \$2,322,354. The annual return based on the twelve months ended Dec. 31, 1921 and on proposed compromise valuation as of Dec. 31, 1920, was 6.1 per cent.

Surplus of \$1,893 in Holyoke

At the annual meeting of the Holyoke (Mass.) Street Railway, on March 21, the directors were authorized to renew the lease of the Mount Tom Railroad, to expire in June next, on as favorable terms as could be arranged. The last lease was for twenty-five years at 6 per cent return on the capital. At the meeting Isaac E. Sawyer was elected a director.

Net earnings of the Holyoke Street Railway for the past year were \$82,413, and after paying dividends at 6 per cent, amounting to \$80,520, a surplus of \$1,893 remained. Receipts and miscellaneous revenue totaled \$1,104,250. Total operating expenses were \$901,431, taxes \$371,571 and interest \$82,834, bringing total expenses to \$1,021,836.

Buffalo Property Reports

International Railway Fails to Realize
Fair Return—Traffic Falls Off—
\$3,000,000 for Improvements

The 1921 operating revenue of the International Railway, Buffalo, N. Y., last year was \$10,721,279. This was insufficient by \$1,186,562 to provide for maintenance, depreciation and renewals, operating expenses, taxes and a fair return upon the value of the property in accordance with a formula adopted by the Public Service Commission when it granted the 7-cent fare or four tokens for 25 cents for the city of Buffalo. This statement was made in the annual report of the company submitted to stockholders on March 28, 1922.

In brief the company sets forth that it inherited from horse-car days a continuing charge against its revenues for the paving of city streets. H. G. Tulley, president of the company, and T. E. Mitten, Philadelphia, chairman of the executive committee, contend in the statement that this charge is unreasonable and an unjustifiable burden upon the car-riding public and one that ought to be removed.

In touching upon service, the report says that 23,000,000 fewer passengers were carried in 1921 than in 1920. Schedules were adjusted to meet traffic requirements and unnecessary service was eliminated. This saving in operating costs offsets in part the loss in revenue. The report calls attention to the survey made in November and December by engineers of the Public Service Commission whose report recommended but 1 per cent additional service. The so-called old Buffalo and Niagara Falls line practically ceased to serve as a through route between these two cities when the modern high-speed line was placed in operation, according to the report which says that those sections of the old line between Buffalo and North Tonawanda and between Niagara Falls and LaSalle are needed for local traffic, but the intervening section between North Tonawanda and LaSalle parallels the high-speed line and represents wasted service, resulting in an operating loss of more than \$150,000 per annum; this adding to the cost of transportation borne by the car riders, should, in the public interest, be eliminated. To avoid the expenditure of approximately \$1,000,000 for municipal paving requirements and reconstruction of track, permission was requested and received from the commission, to abandon the line between North Tonawanda and LaSalle.

New working conditions affecting all hourly paid employees were adopted and made effective May 1, 1921, the report says, and adds that all rates paid employees working at unskilled occupations were adjusted to compare with those paid for similar work in the industries of Buffalo. The International Railway Company's Co-Operative Benefit Association was organized last year for the purpose of promoting true co-operation between men and manage-

ment, and to provide protection to employees in the form of \$1,000 group life insurance certificates and sick benefits of \$1.50 a day. The membership dues were fixed at \$1 a month, the company contributing each month to the funds of the association a sum equal to the aggregate amount of dues paid by members. Nine death claims and sick benefits to 160 members have been paid during the year.

The report closes the first year's operation of the International system under the Mitten Management, Inc., contract. Valuation of the company's property has been prepared for presentation to support the proposed application for a system basis of fare. Industrial relations have been much improved and the Co-operative Benefit Association so advanced in membership as to represent approximately 80 per cent of all employees. The property, it is stated, has been brought to a better state of excellence, with lessened accidents, and the number of suits pending reduced from 1,486 to 778.

W. S. Dunbar, comptroller of the company, sets forth in his report that existing tariffs for transportation over interurban divisions show wide variations. These rates originated largely through agreements made between municipalities and previous managements, prior to the formation of the Public Service Commission. Some of the fares are inadequate, Mr. Dunbar reports, in that they do not pay for the cost of service rendered.

It has, therefore, been recommended that a review of the entire rate structure be made, and a valuation of the system property as a whole be presented to the Public Service Commission with an application for a general adjustment of the rates charged on the International system; this in order to establish reasonable fares conducive to the maximum use of the cars, and productive of an adequate return upon the total investment in the combined system property. The expenditure incurred through improvements and betterments amounting to more than \$3,000,000 entirely consumed the appropriation made from 1921 earnings for maintenance and renewals and approximately \$500,000 of working capital provided by the stockholders.

Seeks to Abandon Line

The Pacific Northwest Traction Company operating out of Everett, Wash., has filed a formal request with the Public Service Commission for permission to abandon its line between Everett and Snohomish, over which no cars have operated since December of last year. Floods late last year caused damage that would require an expenditure of \$60,000 to repair, and this the company is unwilling to spend, in view of the fact that the line has been operated at a loss for three years. The line is about 7½ miles long, 2 miles of which is owned by the traction company, and the remainder is operated under a lease with the Northern Pacific Railway.

Middle West Utilities Makes Report

The Middle West Utilities Company, Chicago, Ill., for the fiscal year ended Dec. 31, 1921, reports a total income of \$3,441,561 and a net income of \$1,616,326. The combined surplus earnings for the year, including \$493,978 the proportion of the subsidiary companies' aggregate undistributed surplus, totalled \$1,207,407. The total gross earnings of the subsidiary companies increased from \$22,729,923 for the year ended 1920 to \$26,348,234 for the year just ended. The company's balance as of Dec. 31, 1921, was \$813,048.

The company refers to its activity with new properties during the year. It makes mention of its acquiring control of the Hydro-Electric Light & Power Company of Connersville, Ind., and also of its securing a controlling interest in the Ironwood & Bessemer Railway & Light Company, the Ashland Light, Power & Street Railway Company and the Big Falls Water Power Company. The report also includes a statement on the status of the company's ten-year 6 per cent collateral gold bonds, the three-year 6 per cent collateral gold notes and the five-year 7 per cent convertible gold notes. During 1921 the company gained approximately 8,000 new stockholders and 5,000 subscribers who are becoming stockholders. This was accomplished through the company's issuing and selling \$4,375,000 in par amount of its 7 per cent cumulative prior lien stock. In addition, \$1,591,600 par amount of prior lien stock was sold on partial payment plan to be issued when fully paid.

York Railways Planning New Property Acquisition

Negotiations are now pending by which the York (Pa.) Railways will ultimately get control of the York Haven Water & Power Company, located on the Susquehanna River at York Haven. This company has been closely associated with the York Railways and has an operating contract with the Edison Light & Power Company, by which an interchange of water power and steam power is effected, enabling the successful operation and development of the water power plant which formerly suffered from shortages due to conditions on the Susquehanna River, resulting in deficiencies which are now supplied by the steam plant of the Edison Company.

The officials of the York Railways, who also control the Edison Electric Light & Power Company, have been in conference with two groups of bankers located in Philadelphia. The deal involves about \$500,000 or about 27,000 shares of common stock now held by Brown Brothers & Company, who hold the controlling interest in the York Railways, and the Edison Electric Light & Power Company.

The York Railways operates 85 miles of electric railway and controls the Edison Light & Power Company, which does a large electric lighting and power

business. If the deal is consummated it will combine the three corporations—the York Haven Water & Power Company, the Edison Electric Light & Power Company and the York Railways.

The York Haven Water Power Company has a funded debt of \$3,760,000 and \$3,000,000 of stock at par. The plant generates 20,000 h.p.

The negotiations are being carried on by Charles R. Rhoads, a member of Brown Brothers & Company; Day & Zimmermann, engineers of Philadelphia; Janney & Company, bankers; Charles H. Bean & Company, bankers, and the York contingent.

Should the deal be consummated, the entire operation will be controlled at York, with local management and with Gordon Campbell as the probable responsible operating official in the capacity of president.

Valuation Case to Be Concluded

With the presentation of testimony as to intangible values, cost of promotion, consolidation and other items, the United Railways, St. Louis, Mo., expects to complete its side of the case at the valuation hearing before the Missouri Public Service Commission at Jefferson City, on April 17. At the recent hearing this phase of the case was opened.

Robert L. Warner, a New York financier, former vice-president of United Railways and an official of the North American Company, testified that there should be an allowance of 10 per cent for going value, 10 per cent for consolidation of the old lines, 10 per cent allowance to cover the expense of financing, and 10 per cent to cover the cost of promotion.

Frank O. Watts, president of the First National Bank, St. Louis, testified as to the allowance for financing, and stated that from 5 to 10 per cent would be a reasonable charge. Breckenridge Jones of the Mississippi Valley Trust Company gave similar testimony. Col. Albert T. Perkins, manager for the receiver of the United Railways, testified that not less than 20 per cent of the reproduction value of the property would be necessary to pay for promotion and financing. "No large amount of capital can be collected for consolidation purposes in handling transportation corporations without large bankers' and brokers' cost," he said.

The tentative valuation fixed by the commission for rate-making purposes is \$50,000,000. Representatives of the corporation and also the receiver expect to show that the value is not less than \$75,000,000. Manager Perkins, in his testimony, said that many things entered into a valuation of such property as that of the United Railways, besides the actual physical value. He cited the contract the United Railways holds with the Keokuk water power dam. "Financed at 7 per cent," he said, "this contract would represent a value in excess of \$16,000,000." And yet a few years ago, this contract was under vicious attack by newspapers.

Stock to Be Issued to Cover Deferred Dividends

The directors of the Columbus Railway, Power & Light Company, Columbus, Ohio, on March 29 took the final step in the declaration of stock dividends on A and B preferred stocks and set March 31 as the date upon which the books will close. The dividend on A is 24.8 per cent and on B 2 per cent. The directors took the first step in declaring these dividends several weeks ago and their action was approved unanimously at a special meeting of the stockholders. Announcement was made that the stock dividend will be distributed as rapidly as the stock certificates can be made out.

The directors plan to hold a meeting about April 10 to declare a cash dividend on B. They will meet about June 10 to declare a cash dividend on A. The directors hope to pay a dividend on common later, but no date has been selected.

The Ohio Public Utilities Commission has approved the issuance of stocks of the company aggregating \$1,288,996, so that the stock dividends could be paid. The commission gave its approval to the revocation of stocks and bonds of the company never disposed aggregating \$774,900.

Abandonment Likely

Railway lines between Mechanicsburg, Carlisle and Cumberland County towns will probably be abandoned by the Valley Railways, Lemoyne, Pa., although some amicable arrangement is being sought. Residents of Carlisle have made a proposal which includes suspension of service on Hanover Street and the continuation of the present Harrisburg-Carlisle line to Cave Hill. The railway officials claim that the lines east of Mechanicsburg are the only ones which pay for operation and that eventually all lines west of Mechanicsburg will be abandoned. The company representatives will report the proposal made by the Carlisle people to the company's board of directors and will inform the Carlisle borough council of the directors' action before their next regular council meeting, April 13.

Ohio Traction Distributes Report

The first printed annual report of the Ohio Traction Company, Cincinnati, Ohio, to be submitted to stockholders was received on March 29. Heretofore the report has been read at the annual meeting, but no copies have been distributed among the stockholders. The report shows railway operating revenue for 1921 of \$8,885,632, a decrease of \$84,723. Net operating revenues were \$2,979,695, an increase of \$298,093. After taxes and rentals, excepting the franchise tax, there was a balance for the year of \$1,079,232, or \$298,093, greater than in 1920. Interest and sinking fund obligations took \$686,117, leaving \$393,115 available for return on capital, or \$22,885 short of the amount

of the allowance for capital return.

The report declares that the present rate of fare should be sufficient to provide the full return on capital for 1922. Passengers carried during 1921 showed a reduction as compared to the previous year, the number being 106,527,759, against 118,618,862 in 1920. The report estimates that there will be a surplus of \$200,000 for 1922, which if realized will pay all but \$133,000 of the accumulated deficit of the company under the service-at-cost ordinance.

The Ohio Traction Company owns practically all the stock of the Cincinnati Traction Company.

Seattle Shows Gain

Annual Report Shows Three Year Deficit of Municipal Railway Reduced to \$1,526,869

D. W. Henderson, superintendent of the Seattle (Wash.) Municipal Street Railway has presented to Mayor Hugh M. Caldwell his annual report showing a gain of \$378,824 resulting from operation of the railway system in 1921.

At the same time City Comptroller Harry W. Carroll made public figures showing that the deficit incurred from the operation of the railway for the three years since the Stone & Webster properties were purchased now stands at \$1,526,869.

Mr. Henderson's figures of railway

SEATTLE MUNICIPAL STREET RAILWAY INCOME PROFIT AND LOSS STATEMENT YEAR ENDED DEC. 31, 1921

Operating revenues.....	\$6,295,564
Operating expenses.....	5,105,487
Operating income.....	\$1,190,076
Non-operating income.....	51,611
Gross income.....	\$1,241,688
Deductions from gross income.....	866,846
Net income.....	\$374,841
Losses accrued (other than income).....	1,412
Income profit and loss income.....	\$373,428
Delayed gains in prior period.....	53,133
Delayed losses in prior period.....	\$202,673
Income profit and loss earned.....	\$223,888
Unearned decrease of deficit by donations.....	2,700
Income profit and loss balance (credit).....	\$226,588

The operating expenses will check with the reports for twelve months of 1921 by adding \$680,629 depreciation charge, \$1,190 ground rental and the auto bus expense of \$31,837, and deducting \$12,079 which is an overestimated amount for industrial insurance.

Included in operating revenues are auto bus revenues of \$16,964.

expense for the year include the large item for depreciation specified by the state accountants, \$680,629, a book charge, while only \$100,000 was actually set aside for depreciation. On the other hand, they do not include any monthly apportionment to meet the \$833,000 annual payment to the owners of the sys-

tem which was made on March 1, and which the Mayor has always considered in analyzing the financial condition of the railway.

Deducting the book depreciation charge from the total expense of the year, and adding the actual depreciation apportionment and the apportionment for redemption of bonds, the gain would be \$326,453, it was pointed out.

FEWER PASSENGERS CARRIED

Superintendent Henderson's report showed that the total expense of the railway for 1921, including operating costs, depreciation and interest on bonds, was \$5,951,385. The revenues for the year were \$6,330,210. The municipal bus lines were operated at a loss of \$14,872.

The total number of pay passengers carried on city cars during the year was 75,724,088, as compared with 98,824,369 in 1920, a difference of 22,916,386.

The report showed a marked decrease in the number of railway accidents. Car collisions decreased 106, collisions with automobiles decreased 433, derailments 125, and miscellaneous accidents 489. The total number of accidents decreased from 5,254 in 1920 to 3,972 in 1921, a difference of 1,282. The only increase reported was in the item of ejectionments and disputes, which are listed as accidents, of which there were nineteen more in 1921 than in 1920. Such controversies between trainment and passengers in 1921 numbered 125.

Comptroller Carroll's figures varied somewhat from those of the superintendent. They credited the railway with a gain of \$226,588 for the year, as compared with large losses during the two previous years. The loss in 1919 was \$517,173 and in 1920 \$1,236,283.

The capital assets of the railway, as shown by Comptroller Carroll's figures, on Dec. 31, 1921, were \$15,205,588, the capital liabilities, \$17,217,765, and the capital deficit, \$2,012,176. The capital deficit, Mr. Carroll explained, is larger than the deficit for the past three years because of the deficit in the old municipal railway fund before the Stone & Webster properties were purchased.

Current assets of the railway, including materials and supplies and cash on hand, at the end of the year were \$1,347,629, while current liabilities, including accounts payable and warrants outstanding were \$922,901. The current surplus was \$424,728.

In his calculations, Comptroller Carroll made the accompanying tabulation, comparing the three years of municipal operation of the general street railway system.

SEATTLE MUNICIPAL RAILWAY RESULTS

	1919	1920	1921	Total
Operating revenue.....	\$4,114,885	\$5,410,764	\$6,295,564	\$15,821,214
Miscellaneous revenue.....	43,268	52,628	51,611	147,507
Operating expense.....	4,067,902	5,585,301	5,105,487	14,758,691
Interest payments.....	607,424	865,560	866,846	2,339,931
Loss.....	517,173	1,236,283		
Gain.....			226,688	
Deficit.....				1,526,869
	1919	1920	1921	Total
Replacements and betterments.....	\$ 193,217	\$ 148,274	\$ 146,074	\$ 477,560

New York State Railways Shows Improved Earnings

The New York State Railways, Rochester, N. Y., has reported railway operating revenues for 1921 at \$10,692,263 against \$10,454,410 in 1920. Operating expenses including \$762,087 for depreciation in 1921 increased from \$8,369,558 in 1920 to \$8,511,376 in 1921. The 1920 expense figure included a depreciation amount of \$567,554. From a net income of \$568,854 in 1921 sinking fund appropriations amounting to \$34,074 were deducted leaving a surplus of \$534,780 against a surplus \$397,047 in 1920.

James F. Hamilton, president of the railways, referred to the company's property in Rochester being valued tentatively at \$17,500,000 and being finally fixed by the board of appraisers at \$19,216,000. He alluded to the fare questions in Syracuse and Utica and intimated that a further reduction in wages was likely at the expiration of the agreement ending May 1, 1922. In discussing the earnings of the company, Mr. Hamilton said:

While the company has earned a substantial amount available for dividends, these earnings have had to be used for corporate purposes. Conditions have been such as to prevent the sale of bonds for the refunding of bonds of the People's Railroad Company of Syracuse and of the Rochester City & Brighton Railroad aggregating \$925,000, which when they became due had to be taken care of by issuing notes discounted at the banks.

In concluding his remarks to the stockholders Mr. Hamilton said the earnings were improving and he looked to the time when bonds would be sold to refund indebtedness and to reimburse the treasury for a certain amount of the expenditures on capital account which had been made from earnings. He was of the opinion that when this was effected it was to be expected that dividends could be resumed on the preferred stock and payment made on account of the dividends which have accumulated on that stock since 1918.

Receivership Lifted in Des Moines

Harris, Forbes & Company, New York, announce that the Des Moines (Iowa) City Railway, having completed arrangements for the satisfaction of its outstanding matured obligations, the properties of that company, for more than three years in the hands of receivers appointed by the United States District Court, by order of the court, have been turned back to the company. The company is now operating under a new franchise under which the rate of fare to be charged will be automatically changed from time to time, according to the costs of operation.

The bondholders' protective committee, representing the general and refunding mortgage 5 per cent bonds, due 1936, announces that upon presentation of certificates of deposit the bonds will be returned without charge to the depositing bondholders, together with interest due July 1, 1921, and Jan. 1, 1922,

plus interest on overdue interest. Non-depositing holders may collect their overdue interest in the usual manner.

Financial News Notes

Valuation Fixed for Reorganization.—The valuation of the properties of Buffalo & Lake Erie Traction Company outside the city of Erie, Pa., has been fixed at \$775,000 for reorganization purposes by the Pennsylvania Public Service Commission.

Increased Gross Earnings in Chicago.—Gross earnings of the Chicago (Ill.) Surface Lines increased from \$55,016,348 in the 1920-1921 period to \$60,343,733 during the twelve months ended Jan. 31. The total cost of operation amounted to \$46,516,150 leaving \$13,827,583 to be used for interest and surplus.

Approval of Security Issue Sought.—The Lafayette (Ind.) Street Railway, Inc., has petitioned for authority to issue \$250,000 of stock, half to be preferred. The company bought, under federal court jurisdiction, the local railway property for \$75,000. The petition says the company will buy new cars and improve the property.

Balance Decreases.—For the twelve months ended Feb. 28, 1922, the Republic Railway & Light Company, Youngstown, Ohio, reports gross earnings of \$7,213,677, against \$8,464,315 for the same period a year ago. The total income realized was \$2,403,676, from which deductions amounting to \$1,978,603 were subtracted, leaving a balance for depreciation, dividends, etc., amounting to \$425,074, against \$438,816 for the twelve months ended Feb. 28, 1921.

Gold Bonds Offered.—Halsey, Stuart & Company, Inc., and A. B. Leach & Company, Inc., are offering \$1,000,000 of the American Public Service Company's first lien 6 per cent gold bonds due Dec. 1, 1942. The price of the bonds is 89 and interest, yielding about 7 per cent. Coupon bonds are offered in denominations of \$1,000, \$500 and \$100. The American Public Service Company is controlled through stock ownership by the Middle West Utilities Company.

Passenger Revenue and Traffic Decrease.—For the two months of operation ended Feb. 28, 1922, the Philadelphia (Pa.) Rapid Transit Company realized a net income of \$350,876 against \$146,362 for the same period a year ago. The passenger revenue for the two months amounted to \$6,446,479 a decrease of \$246,494 over a total of January and February last year. The passengers carried totalled 130,660,707 for the two months of this year against 134,239,820 in 1921.

A Larger Surplus than Ever.—After all deductions the Eastern Pennsylvania

Railways, Pottsville, Pa., and subsidiary companies realized a balance for the year 1921 of \$393,065, which was transferred to surplus account, making the total accumulated surplus on Dec. 31, 1921, \$1,020,895. According to the annual report of President Pardee this surplus was greater than for any previous year. The operating revenue increased from \$1,932,751 in 1920 to \$2,290,526 in 1921. The expenses, including taxes and rentals, increased \$113,755.

Net Income of \$980,838.—The income statement of the Brooklyn (N. Y.) City Railroad for the eight months ended Feb. 28, 1922, and 1921, was made public recently by H. Hobart Porter, vice-president. The eight months ended Feb. 28, 1921, include the strike period. For the eight months ended February, 1922, the company realized revenue from passengers amounting to \$7,412,175, against \$6,345,330 for the same period a year ago. The net corporate income for this period amounted to \$980,838, against a deficit for the eight months ended February, 1921, of \$908,994.

\$50,000 More Approved.—An additional \$50,000 for the city's expenses in the valuation proceedings of the Philadelphia (Pa.) Rapid Transit Company before the Public Service Commission was recently approved by the finance committee of the City Council. An appropriation of \$175,000 has already been approved for the employment of experts. The work of fixing a value on the Philadelphia Rapid Transit properties is for the purpose of determining the permanent rate of fare the company should charge. Chairman Gaffney recently explained how the appropriations had so far been spent.

New United Light Issue Offered.—A new issue of \$7,000,000 United Light & Railways Company, Grand Rapids, Mich., first lien and consolidated mortgage 6 per cent gold bonds, Series A, is being offered by Bonbright & Company, Inc., New York, N. Y. The bonds are dated April 1, 1922, and are due April 1, 1952, and are non-callable for twenty-five years. They are offered at 93½ and accrued interest, to yield more than 6.45 per cent. The company operates properties furnishing diversified public utility service in seventy-seven communities in the Middle West, most of them in Iowa and Illinois.

Service Will Be Resumed.—Railway service will be resumed in Corpus Christi, Tex., by the Nueces Railway. Street car service in Corpus Christi has been suspended since the power plant was destroyed by fire in October, 1921. A new power plant has been built, and the three-phase equipment was cut in last week. During the time the cars were not in operation, transportation was afforded by motor buses operated by the trainmen of the traction company. When the new service is inaugurated a 5-cent fare will be charged, and a twelve-minute schedule will be maintained on the company's lines.

Traffic and Transportation

New Fare Expected

Commission Takes Under Consideration
Chicago's Preferential 5-Cent Rate
—Adjournment Until April 26

An order for a new rate of fare on the Chicago Surface Lines is expected in the near future. The 8-cent fare still continues under federal court injunction, and the Illinois Commerce Commission took under advisement on March 31 the city's application for an experimental rate, preferably 5 cents. The last hearing before the commission was marked by a formal notice from the employees' union that a cut in wages would mean a strike. The Chicago company is now paying a maximum wage of 80 cents an hour for platform men and the union representatives resented the suggestion of the commission and the city that they should do something to help reduce the cost of transportation.

The union statement was presented in written form at the conclusion of evidence. The men asserted that the cost of living in Chicago has not fallen so as to justify a reduction in wages, which, they claim, are for the first time on a basis parallel with living costs. They presented figures to show that rents, fuel and taxes are higher than the government data indicate. In speaking on behalf of 14,000 employees and their families they protested against "that which seems to them an attempt to force these workers and their families back into the condition of want and privation they experienced so many years." They also made a strong defense of present working conditions provided by their agreement with the company, claiming that the city's contentions for a longer work day and more swing runs would be a hardship and would reduce the number of runs so as to deprive thousands of employees of their jobs. They refused to bear the burden of any economies which the companies might be ordered to make.

After the city's attorney had talked for several hours in the closing arguments, the company's lawyer said he would rest his case on the showing made in the federal court that evidence had not been presented to justify a reduction of the 8-cent fare. Counsel for the city stated that he was not asking the commission to fix wages or salaries, but said it could order a rate of fare which would force the company to economize. He suggested that further payments into the renewal and damage funds be prohibited and that the commission might even consider the city's 55 per cent of net receipts as profits because the city will not accept this money.

Chairman Smith of the commission made a statement in which he denied any prejudice or political bias on the part of that body and regretted that the law did not empower him to demand

an explanation of those who have circulated such charges. It has been rumored that the commissioners were agreed on an order for a 6-cent fare and 1-cent transfer charge, to be made effective before primary day, April 11. An adjournment was taken until April 26, when evidence will be resumed in the main case, this proceeding having been based on a demand for a temporary trial of a lower fare.

Petition for Ten-Cent Fare

A committee of business men recently conferred with officials of the Wheeling (W. Va.) Traction Company and urged that a straight 10-cent fare be established from Wheeling to Bridgeport, Martins Ferry and Bellaire, all Ohio towns, and that other fares be cut to not more than 60 per cent above those of 1914. H. C. Ogden, spokesman for the business men, said the company's franchises provide for a 5-cent fare, including transfers, and that these still constitute a contract, although every one agreed that during the war a higher fare was needed. The burden of proof was now on the company.

W. B. Wills, general manager of the Wheeling Traction Company, said the company was operating at a loss. The average seating capacity of a car, he said, was fifty-seven and the average load only twenty. He said the buses operating between Wheeling and the Ohio cities were taking \$10,000 a month from railway revenues. Company officials told the committee they would notify it before July 1 if a fare reduction were practicable.

One-Man Cars Can Be Operated Safely

When the Illinois Commerce Commission authorized the use of one-man cars in Illinois by the Tri-City Railway it referred to the common objection that certain serious accidents have happened in the operation of one-man cars. Yet the commission indicates that there is nothing in the record to show that these particular accidents are due solely to the use of one-man cars.

According to the commission, statistics in the record showed that fewer accidents have happened by the operation of one-man cars than as a result of cars operated by two men, step accidents especially being reduced to a minimum due to one man being in full charge of the car in starting and stopping, obviously eliminating the divided responsibility under the two-men operation. In its statement the commission said that the safe operation of this type of car requires the motorman never to reverse or back them and further that the car should never be operated except from the controller in the end facing the direction toward which it is moving.

Hollywood Rehearing Held

Commission's Engineer Declares Impossible the Plan of Operating
Hollywood Line Separately

The rehearing granted by the California Railroad Commission to communities who protested the recent rate increases on the lines of the Pacific Electric Railway was held on March 20, 21, 22 and 23. The commission's decision of Dec. 24, 1921, granted the Pacific Electric an increase on a mileage basis in interurban fares, which were put into effect on Jan. 1, 1922, and an increase of local passenger fares on its nine local lines in Los Angeles, whereby the commission established a zone system for a 6-cent fare for traveling in each of the two zones, inner and outer and a 10-cent fare for traveling from one zone to another with transfer privileges. Details of the fare order were given in the *ELECTRIC RAILWAY JOURNAL*, issues of Jan. 7 and Jan. 14.

The strongest protest came from the Hollywood Board of Trade, and following the protestants' request the hearing was held in the Masonic Auditorium in Hollywood. It developed at the first day of the rehearing that due to amended petitions filed by the Hollywood contestants, the main issue involved the subject of the extensions to Hollywood of the lines of the Los Angeles Railway rather than the anticipated protest. The Los Angeles Railway angle of the case was disposed of when the commission ordered interested parties to the controversy to submit briefs of arguments within a period of twenty-five days. Ten days additional in which to answer the briefs were also provided for in the governing body's stipulation.

COMMISSION'S JURISDICTION DISCUSSED

At the opening of the rehearing held en banc before the Railroad Commission, President Harley W. Brundige of the commission brought up the point of the jurisdiction of the commission over public utilities and asked for citations upon the point of this overlapping jurisdiction that would make clear whether the power to order extensions of paralleling lines into the territory already occupied by a public utility is vested in the Board of Public Utilities of Los Angeles or in the Railroad Commission.

The Hollywood Board of Trade attorney said that the authority of the commission was paramount in the instance under discussion. The Los Angeles city attorney claimed that the line between the jurisdiction of the city and the commission was not clearly drawn. The opposite side of the argument was taken by E. O. Edgerton, former head of the railroad commission, and at present acting as special counsel for the Los Angeles Railway. Mr. Edgerton stated that the city's present class of twenty-one year franchise makes the financing of such lines an impossibility. The Hollywood Board of Trade is trying to force some authority to extend five different lines of the Los Angeles Railway into Hollywood territory now exclusively served by the Pacific Elec-

tric. The Los Angeles Railway still operates a 5-cent fare in Los Angeles.

It was declared by the Los Angeles Railway counsel that the lines demanded extended had only 4, 5, 9 and 19 years yet to run on their existing franchises, and that the class of franchise now obtainable in the City of Los Angeles was not an asset as the old 40 and 50 year type of franchise granted in the early days; but the newer type was a liability. It was opinioned that any order of any governing body to extend these lines would be confiscatory and force the Los Angeles Railway to apply for higher rates on its entire city lines if it was forced to extend its 5-cent lines into Pacific Electric 10-cent Hollywood territory to satisfy Hollywood's clamor for a 5-cent fare regardless of the haul of over 8 miles involved.

Paul J. Ost, Assistant City Engineer of San Francisco Municipal Street Car Lines, and employed by the Hollywood Board of Trade to show that the Railroad Commission's basis on which the Pacific Electric was granted an increase of rates was unsound met with considerable opposition. He claimed under testimony that his calculations were based on data supplied by the commission's engineers in their service survey and valuation report of the Pacific Electric Railway's property; but it appeared that Mr. Ost got hold of some wrong figures in the report, as Mr. Richard Sachse, Chief Engineer of the Commission, stated that the figures used by Mr. Ost were taken from an incomplete report of the state engineers compiled in June, 1921.

SUGGESTS INDEPENDENT OPERATION

Mr. Ost attempted to set the Hollywood lines out as a separate entity—to be operated independent of the other nine local city lines of the company. The commission's chief engineer explained that this was impossible. It was also cited that the State Constitution and Public Utilities Act prohibits the commission from discriminating against persons and places. It was shown that the earnings of the Hollywood Lines in January and February of this year installing the higher fares showed an increase of approximately \$30,000 over the same months of 1920.

The zone alteration asked for in the amended protest filed with the commission was withdrawn by the Hollywood attorney restoring the zone to original bounds, as Engineer Ost for Hollywood recommended the inner zone be expanded.

Mr. Sachse of the Commission is defending his reports and recommendations to the commission, as attacked by Mr. Ost, claimed Mr. Ost's methods of rate-making theory were wrong and would not apply in the Hollywood case. Mr. Ost opinioned himself as opposed to a zoning system, being favorable to the straight fare as applies on the San Francisco municipal lines. He stated that the main point in which his report departed from the data furnished him by the commission's engineers was in

estimated operating expenses of the Hollywood Lines. The maintenance charged these lines he insisted would bear trimming. His methodical theory of a reasonable rate on the Hollywood Lines was that the present 10-cent fare from the outer zone in Hollywood into the inner zone or vice versa should be 8 cents—a haul of over 8 miles.

During the first two days of the rehearing the Hollywood interests were concluded, and the last two days, as held in the commission's court rooms in Los Angeles, were devoted to rehearing other communities of Southern California served by the Pacific Electric local and interurban lines, who were petitioning the commission for a further readjustment of the rates.

BUS LINES UNDER CONSIDERATION

Attorneys for Alhambra, South Pasadena and Glendale communities leading in the petition for readjustment of the rates had municipal bus lines under consideration, so they informed the commission, but Mr. Sachse gave it as his opinion that very careful investigation should be made before any effort was made to start bus lines to compete with the Pacific Electric. Other suburbs of Los Angeles also filed petitions.

The attorneys from outlying interurban cities did not offer further protest to the valuation figures of the Commission on which a fair return was estimated, as they had previously protested against the valuation figures including a fair return on donated rights of way and bonuses, claiming their rates should be lower on lines operated over such free rights of way and under such conditions.

These communities' attorneys testified it was a judicial point observed in rate-making throughout the United States and the law governed in this respect. The chief counsel of the Pacific Electric filed a brief with the commission outlining the Company's position and attitude in the matter and citing many and certain Supreme Court rulings in this particular instance.

It will probably be forty days before the commission can conclude a decision in this rehearing.

The Los Angeles Railway Corporation's application for a rehearing for a straight 6-cent fare on its lines without taking the token privilege, as formerly authorized by the commission, was scheduled for rehearing at this time. The Los Angeles Railway had rejected the commission's granting of an increase from 5 to 6-cent fare with token privileges and requested a rehearing for purpose of eliminating the token feature and obtain, if possible, permission for a straight 6-cent fare.

While the Hollywood-Pacific Electric case was under way the Los Angeles Railway requested permission of the commission to withdraw its petition for a rehearing, which was granted and the application wiped off the board. This means that the Los Angeles Railway will still continue operating under the 5-cent fare in Los Angeles.

Committee Claims Exoneration From Charges of Bad Faith

An adjustment committee from the Dallas (Tex.) Railway has filed a statement outlining the position of the railway in the present fare controversy. This committee claims that the railway operated at a loss from Dec. 1, 1920, until May 1, 1921, on which date the City Commission granted authority to increase fares from 5 cents to 6 cents. Further that statements showing the company's loss on file with the Supervisor of Public Utilities exonerates the committee which negotiated with the city as well as the executives and members of the railway's Board of Directors from charges of bad faith made by city officials.

The controversy arose when the city officials learned that \$100,000 collected by the traction company since the 6-cent fare went into effect over and above the authorized return of 8 per cent on its invested capital had been paid out to stockholders of the company in dividends. It was claimed that the agreement between the city and the traction company at the time the 6-cent fare was granted, was that additional earnings under the 6-cent fare would be used to make certain improvements, notably paving between the tracks on certain streets ordered paved by the city, and that in not using the earnings as agreed the company had acted in bad faith. The city, when it was learned that revenues under the 6-cent fare had been paid out in dividends, on the ground that back dividends guaranteed by the city were being paid, issued notice of hearing on April 6 on a proposal to reduce fares in Dallas from 6 cents to 5 cents and officials of the company were directed to appear before the commission and show cause why such reduction should not be made immediately.

A detailed statement from the committee outlining the company's position was submitted to the Mayor and Board of City Commissioners. This controversy in Dallas was referred to in the ELECTRIC RAILWAY JOURNAL, issue of March 18.

Increased Fares in Effect

The Public Utilities Commission of the state of Idaho on Feb. 25 handed down its decision in answer to applications of the Boise Valley Traction Company and the Boise Street Car Company for increased fares on city lines. This order authorizes the following schedule for the Boise Street Car Company's city lines and the Tenth and Eighteenth Streets Belt Line of the Boise Valley Traction Company:

Cash fare	7 cents
Ten tickets	50 cents
Forty school tickets.....	\$1.00

The South Boise line operated by the Boise Valley Traction Company was excepted from the order and a cash fare of 5 cents authorized, with forty school tickets for \$1. The new fares became effective on March 6.

Meeting Held in Waterbury on Fare Experiment

A proposal that the Connecticut Company be ordered to reduce the fares in Hartford, Conn., to 5 cents, with an additional charge of 2 cents for transfers, was laid before the Public Utilities Commission recently by Alderman Charles Schmidt of Waterbury during a hearing in Waterbury. It was proposed as a part of a suggested experiment for trial in the four largest cities, and after the experimental period the company would be asked to adopt for all the large cities the plan which has proved most successful in the tests. Alderman Schmidt's plan was to have Bridgeport continue with its present radial rate of 5 cents with no transfers, while New Haven would try a straight 7-cent fare, Waterbury a 5-cent fare with transfer privileges, and Hartford the plan mentioned above.

Two of the three members of the Public Utilities Commission who were present at the hearing announced that the commission would give consideration to the plan and announce its decision later.

A citizens' hearing on the matter of a 5-cent fare on the Connecticut Company's lines was largely attended at New Haven, Conn., recently. President Storrs of the company was not present, having been called to Denver by reason of illness of a relative, and the company was represented by Manager Harlan. Mr. Elwell presided for the Public Utilities Commission, as Chairman Higgins is ill. The petition was twofold—a nickel fare and a re-routing of local lines to give positive rather than indirect service on all lines. There were many speakers in behalf of the fare, some asking for the 5-cent unit and showing a willingness to have a transfer made an extra charge, while others wanted action which would end the plan of having transfer points at busy places on the central streets.

Jitney Regulatory Ordinance Invalid

The city ordinance passed by the City Commission of San Antonio, Tex., several weeks ago regulating the operation of jitneys inside the city limits, has been held invalid and an injunction restraining the city authorities from enforcing its provisions has been granted by Judge R. B. Minor of San Antonio. The ordinance was passed by the city in carrying out its part of the agreement with the Public Service Company, which owns and operates the electric railway system in that city, under which fares were reduced to 5 cents on condition that the city stop the operation of jitneys within the city except those operating to Camp Travis, which is not served by a car line. Since the ordinance was held invalid and its enforcement enjoined, jitneys have run riot, taking any route, desired and maintaining any schedule or no schedule at all.

In his opinion Judge Minor said that

if the controlling purpose of the commissioners in passing these ordinances was to destroy the jitney business and create a monopoly in the San Antonio Public Service Company then two conclusions must follow: First, that the ordinances were not passed for the bona fide purpose of relieving congestion in the interest of public safety, and, second, the ordinance would be void as having the deliberate purpose to create a practical monopoly.

Transportation News Notes

Hearings Ended.—Hearings before the Nebraska State Railway Commission on the application of the Omaha & Council Bluffs Street Railway, Omaha, Neb., for a permanent rate of fare have been concluded. The finding will probably not be handed down before July 1.

Better Relations Sought.—*Trolley Wires* is a new publication in the interest of the employees of the South Covington & Cincinnati Street Railway, Covington, Ky. It made its appearance on March 30. The object of the publication is to seek a better understanding among railway officials, patrons and employees.

Will Experiment with Lower Fare.—If the State Public Service Commission gives its consent, the Grays Harbor Railway & Light Company, operating in Aberdeen and Hoquiam, Wash., will experiment with a 5-cent fare in the two cities, with a 10-cent fare for intercity travel or to Cosmopolis. The present fare is 10 cents in both cities, with the same fare for intercity travel.

Reduced Fare on Toledo Beach Line.—A reduction in fares on the Toledo, Ottawa Beach & Northern Railroad, Toledo, Ohio, has been announced to take effect April 1. The round-trip tickets from the Casino to Toledo Beach for adults will be 30 cents. Children over 5 and under 12 years of age will be charged 15 cents. Forty-five commutation books good for thirty days will cost \$4.80. The former price was \$5.75.

I. C. C. Decision Expected April 15.—The decision of the Interstate Commerce Commission in the matter of a general reduction in rates, it now appears, will not be forthcoming before April 15. At present the case is being studied by the commissioners individually. If they should find themselves in substantial accord, the decision probably could be handed down as early as April 15, but should there be important differences among them, it obviously will extend the time required for the consideration of the case.

One-Man Car Operation Started.—Operation of the new one-man cars on certain of the lines of the Dayton (Ohio) Street Railway was started April 2. At the invitation of W. L.

Smith, general manager of the company, a number of city officials and members of the City Commission, together with Mayor Hale and City Manager Eichelberger made a test trip the preceding week and expressed themselves highly satisfied with the operation of the cars. The city officials were accompanied on the trip by W. A. Keyes, president of the road, and general manager Smith.

Rerouting Ordinance Passed.—Ordinances calling for the rerouting of all downtown lines of the Cincinnati Traction Company were passed by the City Council by a vote of twenty-seven to five, despite the fact that several business organizations voiced strenuous objections to the plan. The principal argument against the rerouting plan is that it is based upon an elaborate scheme of one-way streets in the downtown section. W. Jerome Kuertz, Director of Street Railways, proposes to reroute nearly all downtown lines over seven different loops.

Increased Fares Resought.—The Galveston (Tex.) Electric Company has renewed its efforts to get an increased fare in Galveston, and at the meeting of the City Commission recently a petition from the traction company was presented setting forth that the company can not meet operating costs under its present fare. The petition was referred by the commission to the city attorney for investigation as to the propriety of considering the petition while the suit of the city of Galveston against the Galveston Electric Company, enjoining the company from increasing its fares, is pending in Federal Court.

Fifteen Tokens for One Dollar.—The Public Utilities Commission of the District of Columbia has authorized the Washington (D. C.) Railway & Electric Company to sell fifteen tokens for \$1. The Capital Traction company has been selling at this rate without express authority from the commission. The established fare is 8 cents cash or six tokens for 40 cents, and to save time in purchases the Capital Traction Company advertised fifteen for a dollar, which will now be followed by the Washington Railway & Electric Company.

Fares Adjusted.—Fares on the lines of the City Light & Traction Company, Sedalia, Mo., have been finally fixed by a recent ruling of the Missouri Public Service Commission. Numerous hearings and some changes in previous orders have resulted in a 10-cent cash fare with a ticket rate of ten tickets for 6 cents each and children's tickets for 3 cents each. The property is valued by the commission at \$300,000 and the earnings under the new finding are stated to be about 3 per cent with a 3 per cent allowance for depreciation. In the Feb. 18 issue of the *ELECTRIC RAILWAY JOURNAL* reference was made to the 8-cent cash fare order of the commission.

New Publications

Government Control and Operation of Industry in Great Britain and United States During the World War

By Charles Whiting Baker. Published by the Carnegie Endowment for International Peace, New York. 138 pages.

The tremendous output of the industries in the United States and Great Britain was one of the striking features of the war. The fate of Great Britain and the world, according to Mr. Baker, never hung on a more slender thread than during the early months of 1914, when the question was undecided whether British labor would sacrifice its dearly purchased power over wages, hours of labor, working conditions and output. But Lloyd George accomplished the feat of persuading labor to make this sacrifice, and had he performed no other service he would have deserved perpetual honor as the savior of his country and the world. The industrial record in this country for the five years was a revelation of the world's surplus production capacity, but such stimulation necessarily has to be followed by a period of depression. Mr. Baker's book covers quite thoroughly the action of the government in this country in the case of the railways, public utilities, shipping, labor, fuel, etc., as well as what was done in Great Britain. On the whole, Mr. Baker's answer to the question "How has government operation worked?" during the war must be considered favorable, and he sees in the future an extension of government control over certain industries, in cases where private ownership breaks down.

Principles of Alternating Currents

By Ralph R. Lawrence, associate professor of electrical engineering, Massachusetts Institute of Technology. Published by McGraw-Hill Book Company, New York, N. Y. 482 + xiv pages, illustrated.

This text-book covers the fundamentals of electric circuits in a way which will prove clear and interesting to readers having a thorough preparation in physics and in mathematics through the calculus and the elements of differential equations. Its place is thus the classroom of the high-grade engineering school, or the reference library of the trained engineer who wishes to "brush up" on theory from time to time.

The Electrification of Railways

By H. S. Trewman. Published by Sir Isaac Pitman & Sons, New York, 1920. Cloth 4 x 7 in., 78 pages.

To date there has been but little published on railway electrification for the benefit of the layman. It is the author's intention in this book, without going into detail, to bring to the reader's notice some of the main questions

to which attention must be paid, giving at the same time sufficient technical electrical information to enable these points to be understood. The occasion for the book is the wide discussion that has taken place in England for several years past of the electrification of steam railways. The importance of the subject has steadily increased, especially during recent years, and the author states that there is an urgent need for a more general appreciation of the possibilities of electric traction.

Städtebau ("City Planning")

By Otto Blum, G. Schimpf and W. Schmidt. 478 pages with 482 illustrations, published by Julius Springer, Berlin.

This is one volume of a library of twenty-two engineering books being issued by the publishers under the direction of Robert Otzen. It is divided into three parts, each written by one of the authors mentioned. The first takes up city planning in general, the second transportation in cities and the third paving. It is the second section, comprising 274 pages, or more than half of the book, in which readers of this paper will be most interested.

This chapter is a posthumous work of the author, Prof. Schimpf of Aachen, who died shortly after he had practically completed the manuscript. He had studied American transportation systems in this country and his portion of the book embodies data from all countries. In the first chapter the author takes up the question of traffic distribution, hourly, daily and monthly, in different cities in Europe and America, with load curves and charts, showing lengths of ride in certain cities, with a theoretical division of travel between street cars, rapid transit lines and walkers, based on distance covered. In a second chapter he considers the relations, determined from records, between population, mileage of track, speed and number of passengers; then the subject of ideal and actual layouts for radial and longitudinal cities. The following chapter is devoted to rapid transit station layouts, actual and ideal; another to different types of elevated and subway structures, car-houses and repair shop layouts. The fifth section of the book is given up to equipment and contains designs of different types of rapid transit cars, showing seat arrangement, etc., with a table giving dimensions and weights of cars, total and per seat and per passenger, with other details. In the chapter on operation graphic time tables are given of the Hamburg Stadtebahn and Elevated Railway, lengths of station stop on the Berlin Elevated Railway, according to the number of passenger interchanges, and whether the train consists of one, two, four or six cars, etc. There is almost an equally extended treatment of traffic, line layouts, waiting stations, track construction, overhead construction, car equipment, fares, etc., for surface lines. The concluding chapters in this section relate to bus and ferry operation.

Legal Notes

NEW YORK—Damages from Operation of Elevated Railway.

Where an owner of premises owns land to the center of the street, subject to the public easement, it is proper for the court to consider this fact in fixing the damage from the maintenance and operation of an elevated railway in the street. [Berry vs. City of N. Y., N. Y. Supp., 631.]

NEW YORK—Removal of Subway Kiosks at Company's Expense Not Compelled.

Where a traction company located its subway kiosks on the sidewalks under a certificate issued by the board of rapid transit commissioners with the consent of the city, the company could not be compelled to bear the cost of removing the kiosks when the roadway was subsequently widened. [City of New York vs. Hudson & Manhattan R.R., Northeastern Rep., 152.]

NEW YORK—Receipts from Advertising Are Receipts from Operation.

The section of the Transportation Corporation's Law under which certain routes of the Fifth Avenue Coach Company operated provided that such a corporation " . . . shall also pay to the comptroller or other fiscal officer of said city 5 per centum of its gross receipts from the operation of said routes." The question involved, which was decided in the affirmative, was whether the revenue derived from advertisements in the interior of stages constituted part of the "gross receipts from the operation of said routes." [City of New York vs. Fifth Avenue Coach Company, 127 Northeastern Rep., 910.]

NEW YORK—Passenger, Who Passed Behind Car After Alighting Therefrom and Was Struck by Another Car, Held Contributorily Negligent.

A passenger, who, after alighting from a car, passed behind it and was struck by a car approaching on other track from opposite direction, though she did not actually step on the other track, was held to be contributorily negligent. [Wall vs. International Railway, 188 New York Supp., 550.]

PENNSYLVANIA—A Passenger Struck While on the Step by a Passing Car Was Guilty of Contributory Negligence.

A boy 18 years of age, boarding a crowded street car which he could not enter and standing on a step where he knew that there was only 6 in. clearance between the car and any other car that would pass on the next track, was guilty of contributory negligence. [112 Atlantic Rep., 22.]

Personal Mention

H. S. Day Leaves Kansas City Railways

Henry S. Day, equipment engineer of the Kansas City (Mo.) Railways, has resigned to become vice-president, in charge of production, of Smith & Sons Manufacturing Company, Kansas City, manufacturers of road building machinery. His resignation became effective April 1. R. W. Bailey, superintendent of power, has been made superintendent of power and equipment and assumes the added responsibility of the mechanical department. R. S. Neal, heretofore in charge of the drafting room and engineering work in the mechanical department, has been appointed assistant superintendent of equipment.

Mr. Day took up his work with the Kansas City Railways on July 1, 1919, immediately after his return from France, where he served as a Captain of the 37th Engineers. Prior to the war he was a valuation engineer for Sanderson & Porter and before that was for seven years on the New Haven Railroad in a responsible position in connection with the maintenance of the equipment on the electrical division. His early training was gained with the Westinghouse Electric & Manufacturing Company.

Upon severing connection with the Kansas City Railways, his fellow employees at the shop presented him with a fine Hamilton watch and an alligator traveling bag, and Mrs. Day with a forty-eight piece silver service.

C. W. Preble, superintendent of inter-urban lines of the Ohio Electric Railway, Springfield, Ohio, has taken a similar position with the Cincinnati & Dayton Traction Company, Dayton.

W. G. Neibert, who for several years has been the auditor for the Monongahela Power & Railway Company, with headquarters at Fairmont, W. Va., has been transferred to Parkersburg and will be the auditor for the Parkersburg-Marietta division of the traction company.

M. J. Collins, for twenty-eight years in the service of the Ohio Electric Railway, at Hamilton, Ohio, has been named superintendent and claim agent for the Hamilton district, succeeding Gordon Lewis, to whom he was formerly assistant. Mr. Lewis has severed his connections with the railway.

George H. Hudson has just been appointed master mechanic of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga. Mr. Hudson was master mechanic of the Tampa Electric Company from 1910 to 1918. In the latter year he resigned to become superintendent of equipment of the Monongahela Traction Company, Fairmont, W. Va. He resigned from that company

because of illness and later joined the forces of the Ohmer Fare Register Company which he held until he took up his new work.

Joins Transit Commission

E. A. Roberts of the Beeler Organization Appointed Chief of Transit Bureau

Chief of the Transit Bureau of the New York Transit Commission! This is the title, with its attendant duties and responsibilities as well as honors, bestowed upon Edward A. Roberts on March 23. Mr. Frank Bennett has been named his assistant.

Mr. Roberts takes up his work with no small previous training and experience. He has been assistant to John A. Beeler, consulting traffic expert, and



E. A. ROBERTS

during his connection with Mr. Beeler has done intensive work in the supervising of electric railway operations. His new work will be of prime importance to the Transit Commission, for the expert advice and suggestions which he qualified to offer will increase the value of the regulatory work of the commission.

For some time at least Mr. Roberts' duties will be to work out plans for the efficient utilization of the transportation facilities already in existence. The commission considers that this is the greatest immediate work until new subways can be completed—a matter of perhaps five years.

Mr. Roberts has a long list of accomplishments already to his credit. Since joining Mr. Beeler's organization in 1917 Mr. Roberts has served with the Massachusetts Public Service Commission in the investigation of operating methods and practices preceding state control of the Boston Elevated Railway, and with the Public Utilities Commission of the District of Columbia. His work there was to increase the capacity of the Washington railway systems

under war conditions. He has also made extensive investigations for the Philadelphia Rapid Transit Company and the Public Service Railway of New Jersey.

Among his many duties Mr. Roberts has found time to write several illuminating articles for the *ELECTRIC RAILWAY JOURNAL*.

After his graduation from Harvard College in 1914 Mr. Roberts spent two years with the General Electric Company at Lynn, Mass., and Erie, Pa., in departments connected with the manufacture of electric railway apparatus. During 1916-17 he was a research member of the faculty of the railway engineering department of the University of Illinois, and for a short time thereafter he was associated with the Boston Elevated Railway in its electrical engineering department.

Elbert G. Allen has recently become connected with the Philadelphia (Pa.) Rapid Transit Company's engineering forces. He was formerly advisory engineer with Stone & Webster. Mr. Allen was graduated from the Massachusetts Institute of Technology. He received the degree of B. S. in mechanical engineering in 1900 and E.E. in 1901. He immediately entered the service of Stone & Webster.

William J. Baldwin, assistant to General Manager Kempster of the New Orleans Railway & Light Company, New Orleans, La., in the capacity of publicity director, has resigned to accept the position of assistant to the president of the Alabama Power Company, Birmingham, Ala. Mr. Baldwin's work at New Orleans has attracted unusual attention both for its originality and its forcefulness.

Walter E. Bryan, superintendent of power of the United Railways, St. Louis, Mo., was recently elected president of the Engineers' Club of St. Louis, and president also of the Joint Council of the Associated Engineering Societies of St. Louis. For some time he has served as chairman of the electrolysis committee of the American Electric Railway Association. Mr. Bryan is a graduate of Washington University, and, with the exception of eight months, has served the United Railways in various technical positions continuously since his graduation.

Edwin Gruhl, vice-president and general manager of the North American Company, New York, N. Y., has been elected president of the North American Edison Company, a newly organized subsidiary of the North American Company. The new company was incorporated on March 25 in Delaware. It will own 72.7 per cent of the outstanding common stock of the Cleveland Electrical Illuminating Company and the entire outstanding common stock of the Union Electric Light & Power Company, St. Louis, Mo. The 200,000 shares of no par value stock of the North American Edison Company will all be owned by the North American Company.

Mr. Gadsden Chairman of Committee Reporting on Trade Associations

Philip H. Gadsden, Philadelphia, former president of the American Electric Railway Association, has been appointed chairman of a committee of the Chamber of Commerce of the United States which meets in Washington on April 5 to report on the manner in which trade associations may render the greatest service to business and the public.

George W. Booz has been appointed supervisor of traffic of the Camden lines of the Public Service Railway, Camden, N. J. Mr. Booz was formerly day station master. Jake Adams now holds this position.

Thomas K. Glenn, president of the Georgia Railway & Electric Company, Atlanta, Ga., has been elected president of the Trust Company of Georgia. He plans to give up his work as president of the Atlantic Steel Company.

J. L. Egolf, general superintendent of the Interurban Railway & Terminal Company, Cincinnati, Ohio, has accepted a position as general manager of the Aurora, Elgin & Chicago Railway, Fox River Division, with headquarters at Chicago, Ill.

John Paul Lucas, editor of the *Southern Public Utilities Magazine*, will direct the state "Live-at-Home" campaign in North Carolina. He was appointed by Governor Morrison. Mr. Lucas' work will be to issue information concerning agricultural conditions in the state and to urge the farmers to raise food stuffs so that they may be economically independent.

E. J. Burns, formerly efficiency expert of the San Diego (Cal.) Electric Railway, who is largely responsible for the zone system of fare collection now in successful use there, has been appointed assistant general manager of the company. The appointment of Mr. Burns to the newly created position was one of the first acts of the company's new general manager, Claus Spreckels.

George E. Snider, who has been chief engineer of the Toledo Edison Company, has been promoted to chief engineer of the Ohio Public Service Company, with headquarters in Cleveland. The new position puts him at the head of the production department of the Henry L. Doherty properties at Elyria, Lorain, Warren, Alliance, Massillon, Orrville and Mansfield. J. F. O'Connor, who has had charge of the Acme plant at Toledo, will succeed Mr. Snider. A. L. Rider will take Mr. O'Connor's place.

F. M. Finlayson, superintendent of power of the Worcester (Mass.) Consolidated Street Railway, has been made superintendent of lines also. He has been with this company since 1906, first as chief engineer of the Fremont Street plant. He had previously served the company from 1902 until 1904 as engineer at this station. Prior to the time

he was engineer of power stations for the Newton & Boston Street Railway. During his absence from the Worcester company he was engineer of the power plant of the Pittsburgh, McKeesport & Connellsville Street Railway, Pittsburgh, Pa.

Obituary

Leo Daft

Leo Daft died at Albany, N. Y., on March 29. To many persons engaged in the electric railway industry today Mr. Daft's name is merely a memory, so rapidly is history made, but it was he and his contemporaries, Sprague, Van Depoele, Short, Bentley, Knight and others who, in the pioneer days of electric railroading, laid the foundations on



LEO DAFT

which the industry now rests. To record all the work done by Mr. Daft in the early days would require a volume in itself so firmly was what he did linked with the important developments of the times. These developments Mr. Daft sketched himself in an article over his own name published in the *STREET RAILWAY JOURNAL* for Oct. 8, 1904, on the occasion of the twentieth anniversary of the founding of the paper. This article, six pages in length, reviewed the work done under Mr. Daft's own supervision for the Daft Electric Company in Pittsburgh, Baltimore, Saratoga, Coney Island and on the Manhattan Elevated Railway in New York in 1882 and shortly thereafter. Mr. Daft's active connection with the electric railway industry ceased about 1895. He then traveled extensively at home and abroad until about 1901, when he settled in Rutherford, N. J., and commenced work on a process whereby rubber is vulcanized onto metal plated with alloy. It was along this and allied lines that Mr. Daft had worked recently except for such interruptions as occurred when he was acting as a consultant or as an expert. Mr. Daft was born in Birmingham, England, on Nov. 13, 1843. He was a charter member of the American

Institute of Electrical Engineers, a member of the International Conference of Electricians in 1904, a member of the American Association for the Advancement of Science and a member of the Electro-Chemical Society.

Michael J. Clark, for twenty years with the Associated Bureaus of the Pittsburgh Railways, died in that city on March 17.

George F. Allen, for many years a salesman with the Railway Materials Company, Chicago, and widely known and esteemed among steam and electric railway men of the Middle West, died March 24.

W. T. Pilcher, foreman in the Building Department of the United Railways St. Louis, Mo., was shot by an unknown assailant on Feb. 6, and died Feb. 11. Mr. Pilcher had been with the company nineteen years.

Fred C. Hinds, long identified with the construction of electric railways died March 12, at his home in West Newton, Mass. He was born in Calais, Me., sixty-eight years ago. He was one of the builders of the Boston & Worcester Street Railway, and he also was interested in the construction of the Bay State Street Railway and other lines in Massachusetts.

Otis H. Cutler, former president of the American Brake Shoe & Foundry Company, died recently aboard the yacht "Seramia" off the Florida coast. At the time of his death Mr. Cutler was chairman of the board of directors of the company. His connection with the company dates back to 1902 when he became affiliated with it as vice-president and general manager. His term as president extended from 1903 to 1916. Previous to his connection with the American Brake Shoe & Foundry Company, Mr. Cutler was manager of the Ramapo Foundry Company. From 1895 to 1898 he served in the New York State Assembly and during the European war was manager of the insular and foreign division of the American Red Cross.

Henry P. Nawn, president of the Hugh Nawn Construction Company, Boston, Mass., died March 28 at Gilboa, N. Y. He was sixty-four years old. Mr. Nawn was associated with many large construction undertakings in New England. His work in and near Boston included the construction of the East Boston tunnel, the Washington Street tunnel, the Boylston Street subway and station, the Cambridge tunnel and stations, two sections of the Dorchester tunnel and stations, the tunnel stations at the junction of Washington and Summer Streets, the L Street tunnels of the Edison Electric Light Company, the foundations of the Elevated structure at Sullivan Square, and the concrete structure of the Boston Elevated Railway at Forest Hills. He organized the Hugh Nawn Contracting Company in 1905. Mr. Nawn was engaged on a construction job at Gilboa at the time of his death.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

American Gear Manufacturers to Meet in Buffalo

The sixth annual meeting of the American Gear Manufacturers' Association will be held April 20, 21 and 22 at the Lafayette Hotel, Buffalo, N. Y.

This association, through a sectional committee, has been giving close co-operation to the American Engineering Standards Committee, and the report of this and other committees on standardization promises to be of unusual interest.

Special emphasis will be given to business conditions in the gear industry and the outlook for the immediate future.

Among the subjects to be discussed are "Good Hob Practice," by H. E. Harris of the H. E. Harris Engineering Company; "The Use of the Projector Comparator in Testing Gear Teeth," by Ralph E. Flanders of the Jones & Lamson Machine Company; "Proportions of Industrial Gears," by G. E. Katzenmeyer of the R. D. Nuttall Company; "The Grinding of Gear Teeth and Its Future in the Industry," by R. S. Drummond of the Gear Grinding Machine Company; "The Gleason Works System of Bevel Gears," by F. E. McMullen and T. M. Surkan of the Gleason Works, and "Conditions in the Industry," discussed from the standpoint of the industrial lumber companies under the leadership of George L. Markland, Jr., of the Philadelphia Gear Works and from the automotive standpoint with R. P. Johnson of the Warner Gear Company presiding.

An informal banquet for representatives and guests will be held on Friday evening, April 21, the principal speaker of which will be John C. Bradley of the Platt & Letchworth Company, Buffalo, N. Y., who will take as his subject "What's Ahead."

New Cars Received in London

The London County Council has begun to receive delivery of 125 new tarmacars, which have been on order for considerable length of time. On Jan. 1 a demonstration trial run was given with one of these cars. In general appearance they are quite similar to the cars now in use, being double truck, double deck, with top deck covered, and having a total seating capacity of twenty-eight passengers. There are no changes in the equipment, however. The new cars have two motors of 30 hp. each, as compared with 42 hp. and with the older cars. These latter in hauling trailers are not able to accelerate as rapidly as is desired. The new cars will be able to accelerate with a trailer at a rate of 1.37 m.p.h. per

second, which is the rate of the older cars without trailers. By using the new cars in trailer service as far as possible, the average speed on any route will be increased. When running without a trailer the new cars can accelerate at a rate of 2.06 m.p.h. per second, up to a speed of 12 miles per hour. Another improvement is the use of a combined folding step and side lifeguard under it. When the motorman pulls up the step the guard comes into position. The lighting and ventilation on both decks are improved, the light being more evenly distributed and the ventilation improved to prevent draughts.

Proposed Electrification in Hungary

Present conditions indicate the necessity for electrification of Hungarian railways. Although the Government has not arrived at any decision regarding this matter, it is proposed ultimately to electrify all trunk lines radiating from Budapest—a total of about 870 miles, or 1,245 miles including double tracks. No decision has been reached as to the system of electrification, though a new split-phase system, somewhat similar to that of the Norfolk & Western Elkhorn grade, will be given a trial. An experimental run will be started about the end of April on a short line of about 15 km., equipped with overhead construction. If the test proves satisfactory, a definite decision will be arrived at next year, and general electrification will be pushed as rapidly as financial and manufacturing conditions will permit.

New Car Company to Start Operation

The Missouri Car Company, incorporated in Missouri in September, 1920, for \$500,000, has purchased a ten-acre tract with building 567 ft. by 102 ft. in East St. Louis and announces it will begin on June 1 the manufacture of trucks for one-man cars under patents by Theodore A. Brewster. Mr. Brewster was formerly with the St. Louis Car Company and the J. G. Brill Company. He will be vice-president and chief engineer of the new company. Edward S. Stebbins will be president of the company. He has been Western manager for a large Western corporation manufacturing hydraulic equipment and has lived in St. Louis six or seven years.

In describing his patents Mr. Brewster says his "non-rollicking" truck will be in the light-weight safety class, specially designed for cars of the Birney type. A feature is that the lower section of the journal box is removable, thereby making it pos-

sible to remove wheels and axles without disturbing the journal boxes. The side frames of the truck are of standard I-beam sections. The truck is designed strictly in accordance with A.E.R.A. principles, making it possible to use axles and wheels out of any A.E.R.A. trucks without change. It will manufacture all types of steel cars for city and suburban service, also large motor bus bodies. The company expects to employ 500 men. It will probably be in the market for steel sheets and structural shapes of various weights and sections, also malleable castings.

Municipal System Planning Two Hundred Car Purchase

Inquiries have been made and specifications are being prepared for 200 Peter Witt type cars for the Detroit Municipal system. Bids for the construction and furnishing of these cars will be asked for soon after the election if a favorable vote is cast on the taking over of the city lines of the Detroit United Railways. The Peter Witt cars will be purchased to replace about 340 single-truck cars now being operated by the Detroit United Railway. The commission plans on improving the service by rerouting certain cars and providing new and clean cars to replace the older cars which are now being used.

Rehearing Sought on Lumber Interests

Rehearing of the open price association practice in trade or modification of the decree in the hardwood lumber to permit of the collection and dissemination of production, sales and stock reports has been requested of the United States Supreme Court in a petition filed by the American Lumber & Lumber Company, the defendants in the recent suit in which the court decided the practice was illegal because in violation of the anti-trust law. The lumber interests base their request on misinterpretation of certain phases of the case, and make general denial of the conclusions of the court that the purpose of the practice employed by the lumber interests was to curtail production or enhance prices.

Metal, Coal and Material Prices

Metals—New York		April 4, 1922
Copper, electrolytic, cents per lb.	12.675	
Copper wire base, cents per lb.	14.062	
Lead, cents per lb.	4.10	
Zinc, cents per lb.	5.90	
Tin, Straits, cents per lb.	29.50	
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	\$4 575	
Somerset mine run, Boston, net tons	1.875	
Pittsburgh, mine run, Pittsburgh, net tons	1.85	
Franklin, Ill., screenings, Chicago, net tons	2.05	
Central, Ill., screenings, Chicago, net tons	1.875	
Kansas screenings, Kansas City, net tons	2.50	
Materials		
Rubber-covered wire, N. Y., cents per lb.	5.90	
Weatherproof wire base, N. Y., cents per lb.	13.50	
Cement, Chicago net prices, without bags	\$1.97	
Linseed oil, (5-bbl. lot), N. Y., cents per gal.	84.00	
White lead, (100-lb. keg), N. Y., cents per lb.	12.25	
Turpentine (bbl. lot), N. Y., cents per gal.	68.00	

Rolling Stock

Pittsburgh Railways has ordered forty cars from the Standard Steel Car Company.

Binghamton (N. Y.) Street Railway, through William G. Phelps, receiver, recently awarded a contract to the Cincinnati Car Company for seven new double-truck steel cars at a cost of \$71,545.

Tampa (Fla.) Electric Company will purchase twenty single truck Birney cars and four double truck cars if the funds for the program of improvements are voted at the meeting of the stockholders in Tampa on May 2.

Brooklyn (N. Y.) Rapid Transit Company will expend \$860,000 in converting several cars into the one-man type and for reconstructing tracks of several lines. Mr. Garrison, receiver, said that the present financial condition of the company warranted this expenditure to rehabilitate the company's service.

Track and Roadway

Calgary (Alta.) Municipal Railway has asked the City Council to approve a recommendation for the rehabilitation of the electric railway. It is reported that approximately \$24,000 a year for ties and about \$40,000 a year for sub-base will be required during the next eight years.

United Railways, St. Louis, Mo., following approval by the receivers, is placing orders for material to construct fifty motor cars of the Peter Witt type to be built in its own shops. The new cars will be of the same general construction as fifty-one motor cars built last year. The approximate cost is \$500,000. A total seating capacity of sixty passengers will be provided and the approximate weight will be 35,000 lb.

Tacoma Railway & Power Company, Tacoma, Wash., will share in the repairing of Broadway, from Seventh to Seventeenth Streets, at a total cost of \$175,000, by the relaying of tracks and standing a portion of the paving expense. The new rails required will cost \$20,910. Laying new ties and foundations, tearing out old tracks and paving approximately one-third of the width of the street will cost between \$60,000 and \$70,000, making a total expense of \$90,000 to the company.

Seattle, Wash.—To finance the purchase of rails for use on First Avenue, to be installed in connection with new paving there, the city of Seattle, Wash., may resort to giving bonds to the manufacturers in payment for material and to the contractor who performs the work. A bond issue of \$680,000, including this project, has long been authorized, but the securities failed to sell recently, although publicly advertised. Corporation Counsel Walter F. Meier has begun preparation of an ordinance directing the Board of

Public Works to prepare plans and specifications for the improvement.

Columbus Railway, Power & Light Company, Columbus, Ohio, has several important improvements in prospect which were recently approved by the stockholders. These include paving of the company's share of Front, Third and East Main Streets, installing a double track on Third Street, extending the tracks used by Leonard, Linden, Mount Vernon and Shepard cars directly east on Spring Street to Cleveland Avenue instead of turning at Chestnut, Naghten and Fourth Streets.

Cincinnati, Ohio.—Plans and specifications for Section No. 6, the longest stretch of the rapid transit loop for Cincinnati, have been completed by the Rapid Transit Commission. The unit is to be built in the open and will extend a distance of approximately 3 miles. The estimated cost is \$399,635. Bids on the construction will be advertised at once. Frank Krug, chief engineer, reported at the meeting of the commission that of the \$6,000,000 bond issue voted for the rapid transit loop bonds to the amount of \$3,300,000 had been issued and sold and that the commission had remaining \$2,700,000 to be sold.

Indiana Service Corporation, Fort Wayne, Ind., track extensions to the site of the International Harvester Company plant east of the city will be delayed until actual work is started on the new plant, according to S. W. Greenland, general manager of the railway. Plans have practically been completed for the work. Mr. Greenland said, but the two lines called for in the contract between the traction company and the Harvester company will not be started until more definite information is available. The corporation, said Mr. Greenland, is now devoting its efforts to the erection of a high-tension line from the Decatur interurban road to the Fort Wayne, Van Wert & Lima electric system, to provide feeders for the Harvester company plant for power and lighting.

Power Houses, Shops and Buildings

Toledo & Indiana Traction Company, Toledo, Ohio, is planning a new interurban freight station at Washington and Ontario Street.

Hagerstown, Md.—The Western Maryland Railway and the Hagerstown & Frederick Railway have entered into a contract by which the former will dismantle its electric power generating plant in the shops at Hagerstown and thereafter purchase power from the Hagerstown & Frederick Railway.

New Orleans Railway & Light Company, New Orleans, La., is revising plans perfected thirteen years ago for the erection of an office building. The company's headquarters were recently destroyed by fire. If found suitable with changes adaptable to present construction methods an up-to-date building will be erected upon the old site at

Common and Baronne Streets. Meanwhile the company's headquarters temporarily will be at 421 Baronne Street.

Rutland Railway, Light & Power Company, Rutland, Vt., has removed its motor-generator set from the Rutland substation and installed it at Castleton Corners. This will supply the railway with 60-cycle current at this point and is the last change necessary to transfer the railway load from 25 to 60 cycle. A new 60-cycle generator for the Cavers Falls generating station, which is replacing a 25-cycle machine, is now being installed.

Seattle, Wash., city officials are considering steps to reduce the amount of power purchased from the Puget Sound Power & Light Company to operate the Seattle Municipal Railway. The City Council utilities committee has ordered a favorable report on a resolution by Councilman Philip Tindall, calling on J. D. Ross, Superintendent of City Lighting Department, for a statement as to the earliest date at which the light plant will be ready to take over 5,000 kw. of the railway power load. Under the contract of purchase for the traction property, the city has a right at any time after March 1, 1922, to take over 5,000 kw. from the load now being furnished by the Puget Sound Company by giving one year's notice.

Trade Notes

The Uehling Instrument Company, manufacturers of CO₂ recorders and other fuel economy equipment, announces that the principal office of the company is now located at its factory in Paterson, N. J., instead of at the former address, 71 Broadway, New York City.

Combustion Engineering Corporation, New York, N. Y., announces the opening of a new branch office at 1137 Guardian Building, Cleveland, Ohio. This office will be in charge of Frank Henderson, who has been associated with several of the most prominent stoker companies in this territory for many years.

Largest Order for Power-Saving Devices.—A note in this department in the issue of March 25 regarding the recent Philadelphia order for Economy watt-hour meters referred to it as "probably" the largest order for power-saving devices ever placed. The comparison intended was in amount of money involved. The Brooklyn order in 1920 for 2,400 Arthur recorders is claimed still to hold the record for number of devices sold on a single order.

Chester F. Gailor has resigned as consulting engineer of the Trackless Transportation Company, New York City, to devote his attention to other business with which he has been closely associated. He was in 1913 made assistant chief engineer of the United Railways & Electric Company, Baltimore, and before that was with the Hartford division of the Connecticut Company.

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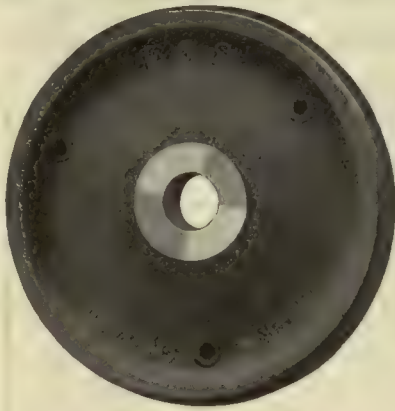
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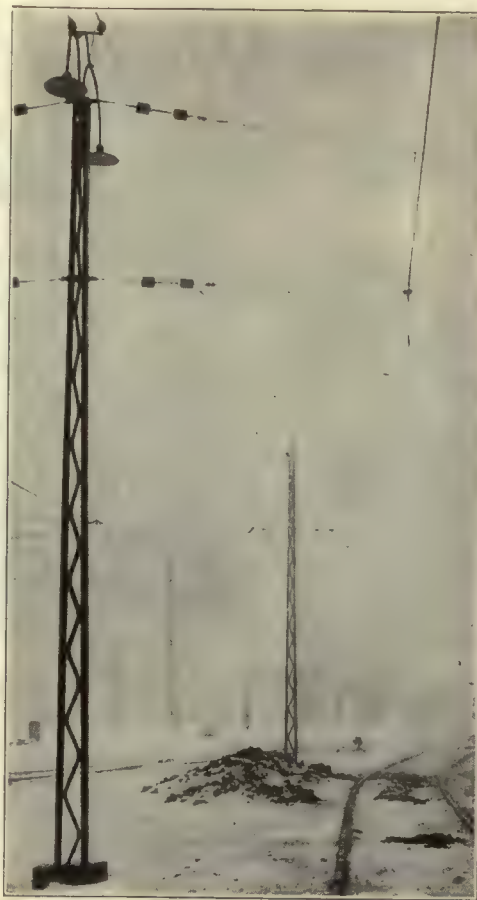
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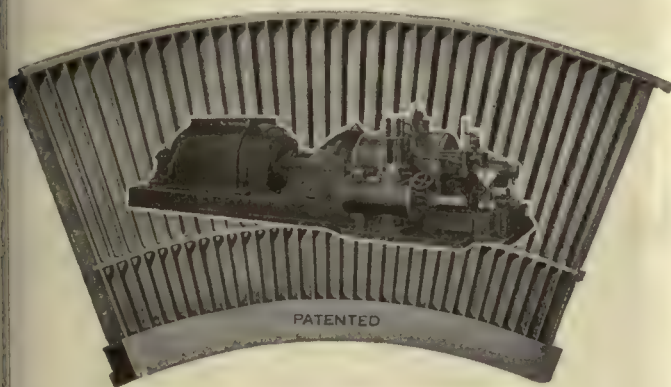
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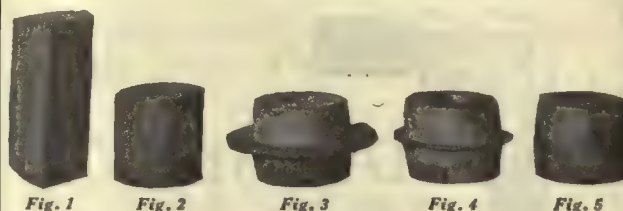


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The illustrations above show the various steps in forging Nuttall special drop-forged motor pinion blanks.

Figure 1—Section cut from square rolled billet.

Figure 2—Billet upset and rounded.

Figure 3—Blank rough forged—first forming operation in retaining die.

Figure 4—Blank finish forged—second forming operation in retaining die.

Figure 5—Blank sized and trimmed—ready for machining.

Result—Improved Basic Material.

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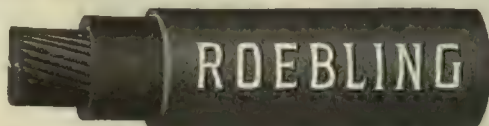
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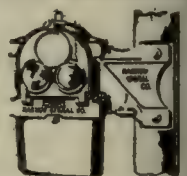
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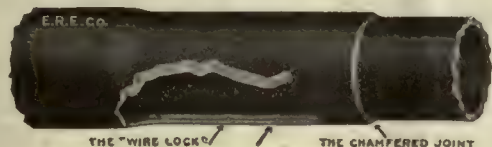
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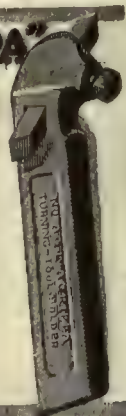
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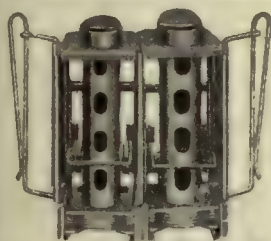
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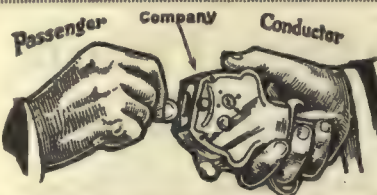
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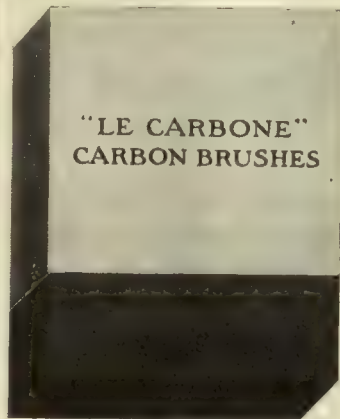
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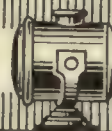
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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

Of Electric Railway Journal, published weekly at New York, N. Y., for April 1, 1922.

State of New York } ss.
County of New York }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared James H. McGraw, Jr., who, having been duly sworn according to law, deposes and says that he is the Secretary of the McGraw-Hill Co., Inc., Publishers of Electric Railway Journal, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

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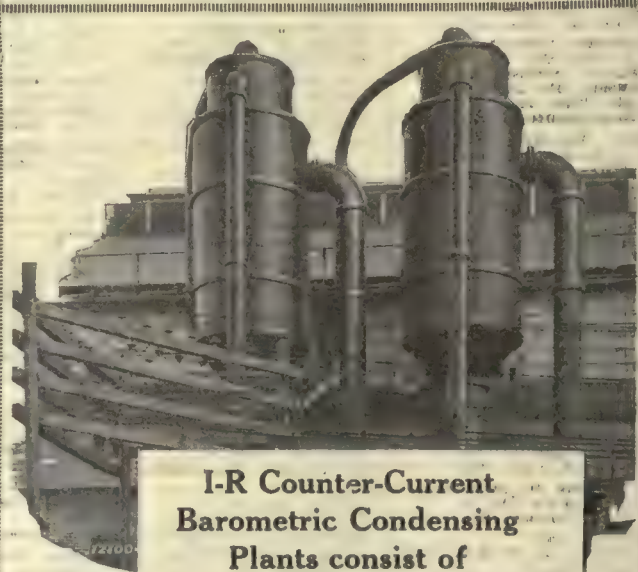
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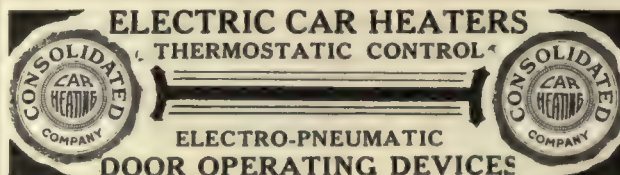
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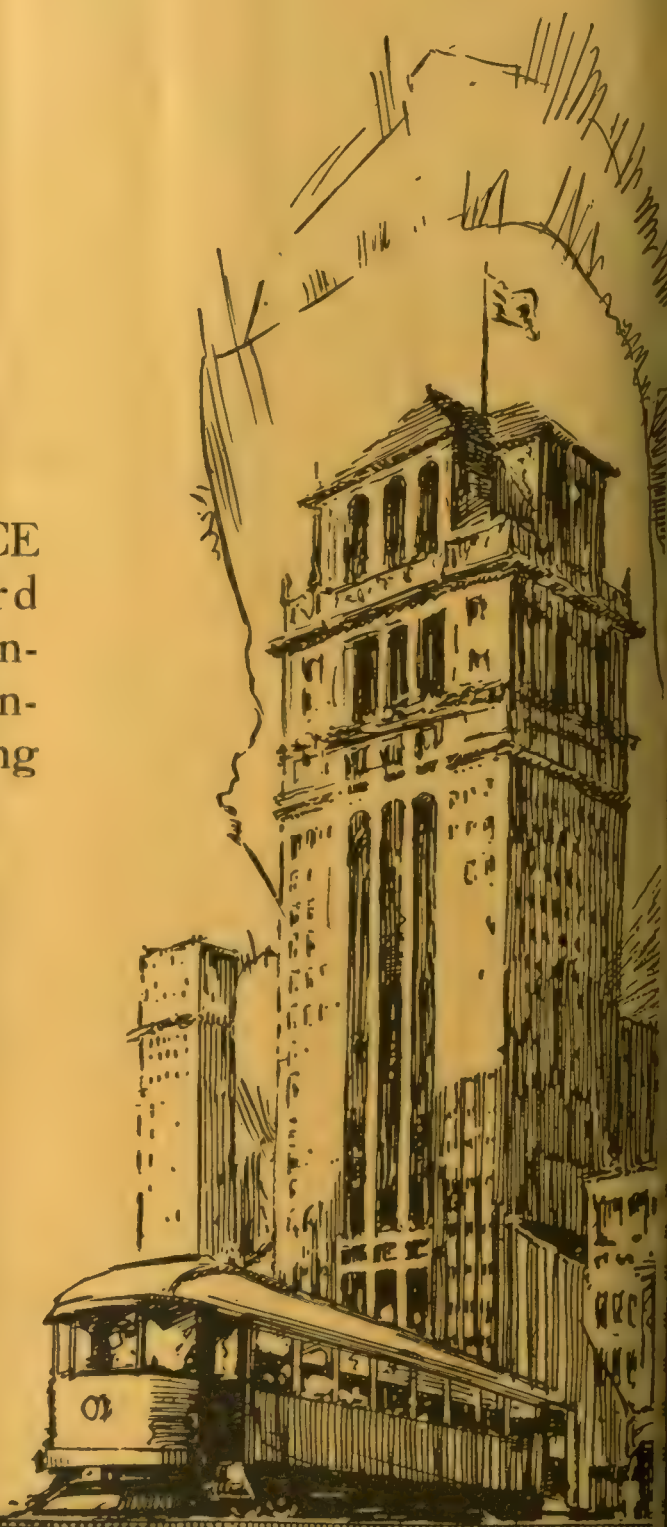
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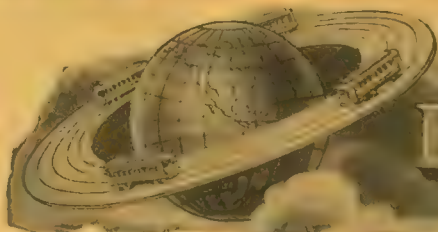
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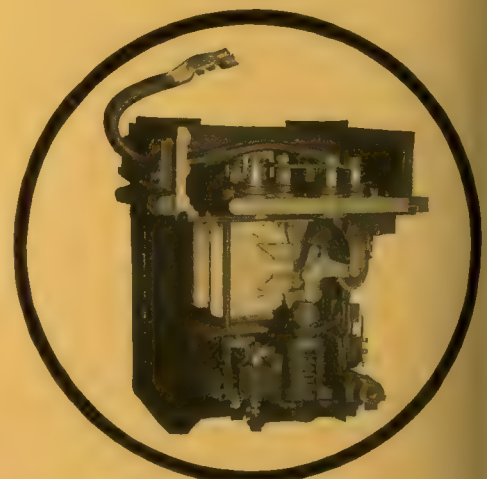
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Westinghouse

Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors

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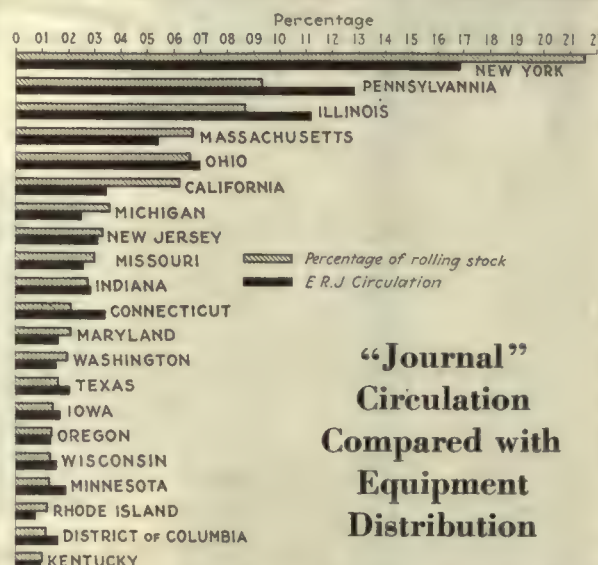


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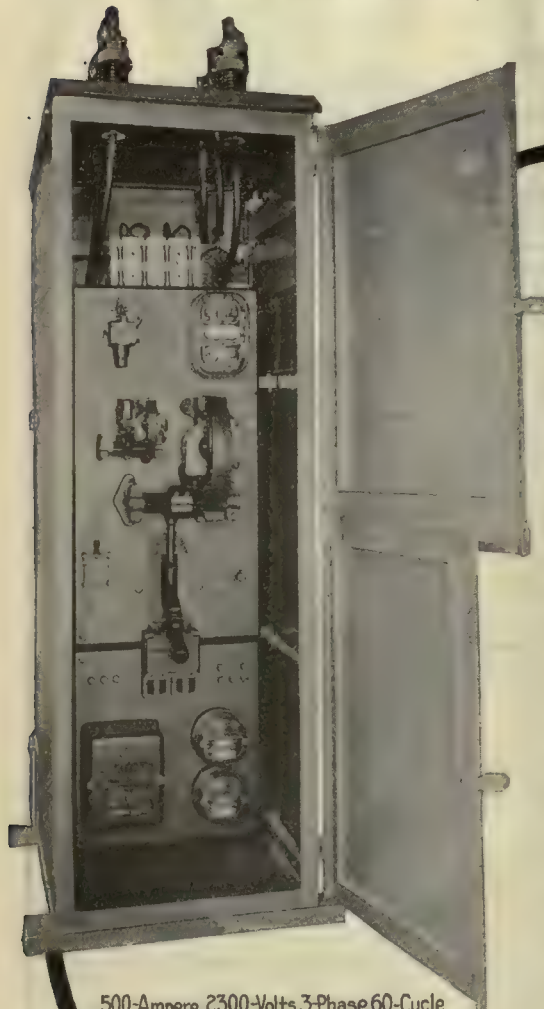
"Journal" Circulation Compared with Equipment Distribution

OF the 6,000 weekly readers of *ELECTRIC RAILWAY JOURNAL*, how many ever give a thought to the location of the other 5,999 who also appreciate the value of this medium in keeping abreast of the industry? Is its circulation concentrated mostly in large electric railway centers or do copies of the paper reach the more isolated properties as well? These queries are answered graphically in the accompanying chart. It is a comparison between the percentage of *ELECTRIC RAILWAY JOURNAL*'s circulation in each state and the amount of rolling stock in that state, both shown as a percentage of the total in the country. A glance shows how closely the circulation in each state has followed the development of the industry there. Rolling stock is used as the index of the comparative state activities and progressiveness of the electric railways, because it is probably a closer measure than any other single thing. The net circulation figures were taken from a recent report made to the Audit Bureau of Circulations, to which publisher members make a detailed statement every six months for audit by the Bureau.

Proper allocation of subscribers, as well as volume, is a factor indicative of the worth of a publication's circulation. Likewise it is a measure of the thoroughness with which a paper is serving its particular industry and shows that circulation building efforts have been correctly proportioned and directed. To those readers of *ELECTRIC RAILWAY JOURNAL* who know that it is read year after year by 98 or 99 per cent of electric railway executives and operators, this analysis will be merely a confirmation of that fact. It should demonstrate to the other readers how *ELECTRIC RAILWAY JOURNAL* aims efficiently to keep the entire industry well-informed, unified and progressive.

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Assure Uninterrupted Service



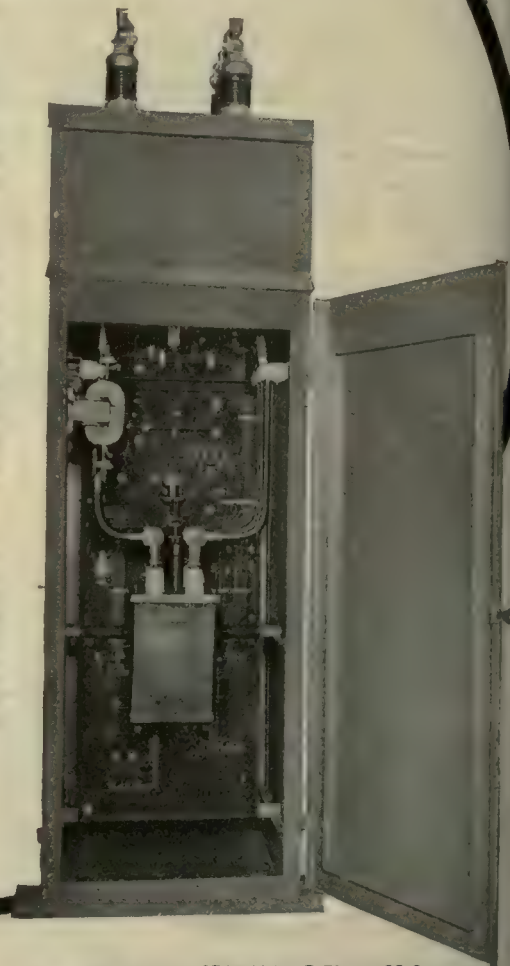
500-Ampere, 2300-Volts, 3-Phase, 60-Cycle
Automatic Outdoor Switch House, Periodic
Re-closing Feeder Equipment—Front View.

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Automatic Outdoor Switch House, Periodic Re-closing
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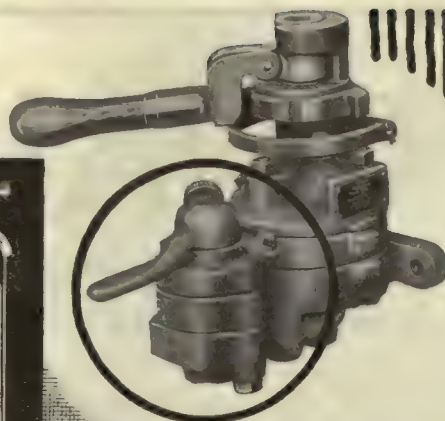
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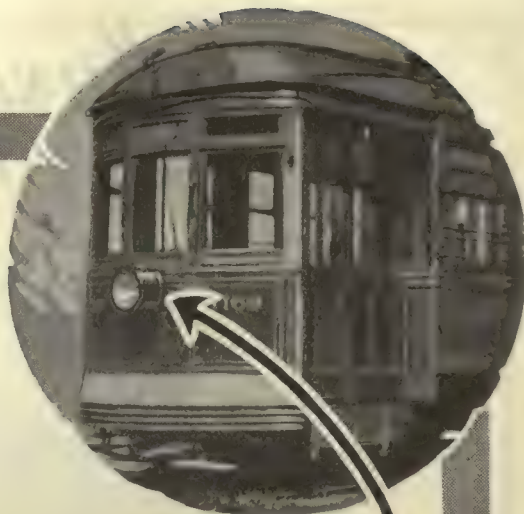
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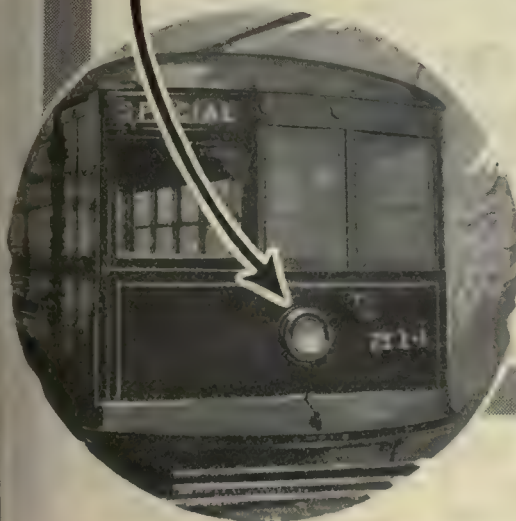
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 Liability
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 Strike, Riot—Civil
 Commotion
 Tornado and Windstorm

An understanding of Marsh & McLennan's conception of the word service will always be a determining factor among our clients.

For years we have rendered a highly specialized engineering service to the leading Public Utilities of America.

May we tell you more what insurance, plus Marsh & McLennan service, means to the business executive who would safeguard his profits, eliminate hazards and reduce his insurance cost?

Marsh & McLennan are qualified to handle your insurance in a practical and effective manner. We invite consultation and will be glad to submit facts upon which we base our claims.



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Thirty per cent fewer rail fastenings with Steel Twin Tie Track. It has been assembled, aligned and surfaced for 12 cents a foot.

Check Steel Tie construction with these essentials of good paved track—

Bearing—The efficient design of Steel Twin Ties provides 156 square inches of effective bearing per track foot at the lowest cost per unit of bearing—and, where it is most needed, 468 sq. in. of bearing under each joint.

affected by water, temperature variations or rot.

Economy—Steel Tie Track minimizes excavation, concrete and track labor. It costs no more than wood ties in rock ballast and its longer life decreases the cost per track-foot per year.

Permanent Materials

—In Steel Twin Tie construction, the tie structure embedded in concrete is not

For estimating get the 1922 prices at your delivery point.

THE INTERNATIONAL STEEL TIE CO., CLEVELAND

Steel Twin Tie Track



Ajax Electric Arc Welder

Let's Go

into the question of welding

What are the vitally important features a railway man demands in his choice of welding equipment? Are they not, first of all, sufficient amperage to make a deeply-penetrating weld under any conditions, and next, low cost of handling and maintenance?

The Ajax Electric Arc Welder

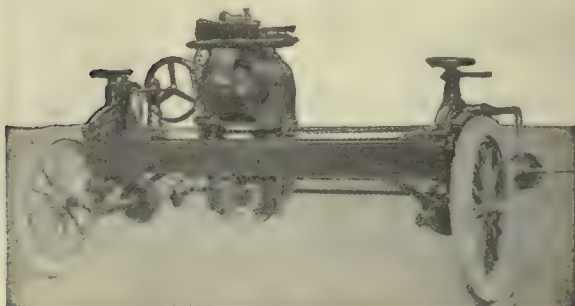
— *meets all these requirements*

The highest capacity welder of its class. Its normal rating is 333 amperes at 600 volts; where the line voltage falls as low as 300 it still gives over 200 amperes. Thus a deeply-penetrating, firm and solid weld is certain under worst conditions.

The Ajax Welder is so rugged and simple in construction that any reasonably intelligent work-man can be taught to operate it efficiently and rapidly. It is so

light that two men can pick it up and carry it anywhere. In case an accident damages a coil anyone can install a new one quickly. There's nothing else to get out of order!

Its usefulness extends to bonding, welding fish plates, building-up cupped joints and broken special work, repairing castings and in general shop work.



Universal Rotary Track Grinder

A Leading Line of Grinders

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Send for catalogues.

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**Steel—Riveted—Welded—Light
Strong—Rigid—Durable—Tight**

**It's a
KEYSTONE**

The Keystone Steel Gear Case—"a real case of real service"—is known to hundreds of the largest operators of the country.

The operator trying and having been convinced as to the exceptional merits of the Keystone Case, has passed the good word along—with the result that Keystone invariably flashes in mind the instant motor gear protection is mentioned.

With the increasing popularity of the safety car the demand for Keystone Gear Cases is continually growing due chiefly to the fact that the Keystone Case lightens the load without sacrificing any of the protective and wearing factors which make the gear case a common requisite.

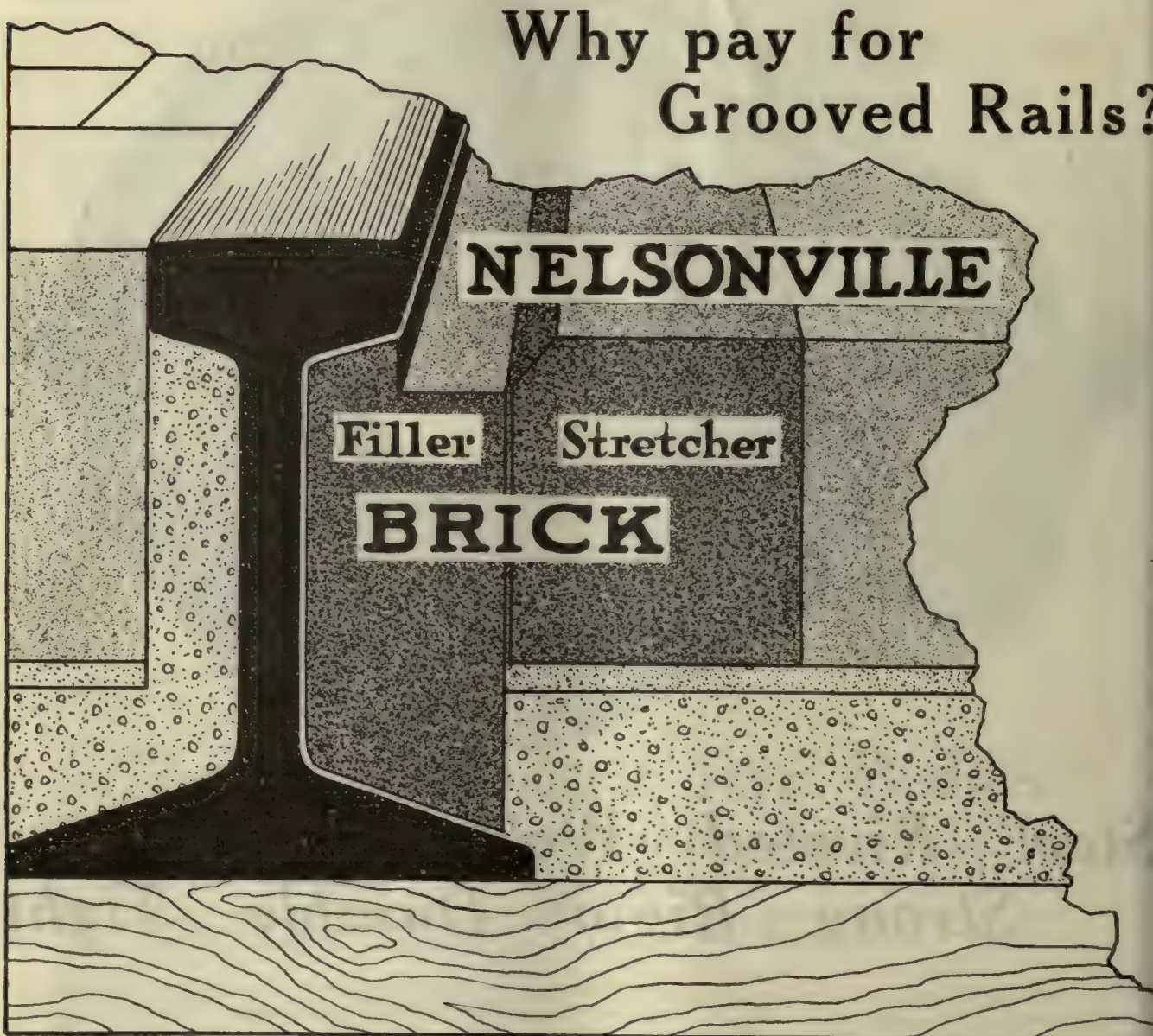
**Try a Keystone Steel Gear Case on any type of car.
Write for data sheets.**



ELECTRIC SERVICE SUPPLIES Co.

Manufacturer of Railway Material and Electrical Supplies

Philadelphia, 17th and Cambria Sts.; Pittsburgh, 829 Oliver Bldg.; Scranton, 316 N. Washington Ave.; New York, 50 Church St.; Chicago, Monadnock Bldg.



Satisfy City Officials with Tee Rail

Paving requirements imposed on street railways are bad enough without forcing them to buy costly groove rail as well. Attempts to use Tee Rail with ordinary block paving have been made, but with such poor results that city engineers generally demand groove rail construction until shown what Nelsonville Rail Brick can accomplish.

Designed in the first place by a prominent city engineer to meet this very problem,

Nelsonville Rail Brick is rapidly gaining the approval of public officials who have the say.

The groove is smooth and perfectly aligned. It is as easily kept clean as the steel groove.

Laid without grouting, it eliminates all chance of breaking-up under vibration. This also decreases cost of getting at rail-joints for repairs, as the blocks are easily removed and replaced without harm.

Try your next paving job the Nelsonville Way.

THE NELSONVILLE BRICK COMPANY
Nelsonville, Ohio

*Modernize!**Pneumatize!*

Passengers Want Just Four Things

A—to get on quickly, easily, safely.

B—to get off quickly, easily, safely.

C—to avoid delay when paying, at either entrance or exit.

D—to have the car *keep moving*.

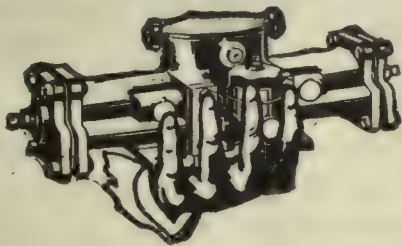
It might all be boiled down to *speed and safety*—for that matter!

And YOU want just ONE thing.

A—more revenue from more fares.

The rest of the alphabet doesn't matter much, which in turn boils down to the simple fact that when the four wants of your passengers can be satisfied by the conductor's merely moving a little lever or pressing a button—

leaving him free to concentrate all his attention on YOUR one want—



conditions will seem pretty near perfect, won't they?

No we're not speaking of the millennium, but merely of those cars whose doors, steps and signals are synchronized and controlled by

The National Pneumatic "Rushour" Line

Door and Step Control
Motorman's Signal Lights

Door and Step Operating Mechanisms
Safety Interlocking Door Control
Multiple Unit Door Control

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

National Pneumatic Company, Inc.

Originator and Manufacturer

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Edison Bldg., Chicago

Works: Rahway, N. J.

WHEN THE OUTLAY THEN—IT'S



We invite your attention to certain fundamental principles in track construction which are worthy of consideration—

The foundation, the immediate support and fastening of the rail, the proper protection and support of the joints, the life of the street paving and the initial cost.

Each and every one of these points is given special consideration in the construction of Dayton *Resilient* Ties.

Years of service under the most severe conditions have proven that they are built on sound principles and are fundamentally correct.

DAYTON

JUSTIFIES THE LAYOUT TRACK BUILDING TIME

When track costs per annum equal or exceed interest and investment costs on a new track, then it's time to consider complete reconstruction and—

When you consider new construction you certainly want to do the job right and at the least possible first cost.

You want permanency and freedom from joint repairs and adjacent street paving.

What you want is the coming thing in track construction — Dayton *Resilient* Ties.

Accurate cost figures show that this track saves \$6000 a mile over wood ties in con-

crete and \$2000 as compared with wood ties in gravel ballast.

In addition to these remarkable savings in first cost, Dayton *Resilient* ties insure longer life to track and paving—they reduce to a minimum both track and paving repairs—they reduce traffic noise and upkeep of rolling stock by cushioning the shocks and jars on foundations that lack *resiliency*.

Perhaps a two-cent stamp spent *now* will save you thousands of dollars next month in new track construction. Just drop us a line asking for complete information about Dayton *Resilient* ties.

THE DAYTON
MECHANICAL TIE CO.

706 Commercial Bldg.

Dayton, Ohio



**Resilient
TIE**



An Outside Plant with 33,000 volt line equipped by the nearby Western Electric Distributing House.

Simplify the Buying For Your Spring Overhauling

To get everything for the Spring needs of your outside and inside plants at the same place will simplify your buying.

Our Distributing House near you can help you simplify it. It carries large stocks of standard goods. It can give quick deliveries. It enables you to cut down the routine of buying. You have all the advantages that would follow stocking everything yourself, without the investment such a stock entails.

There are 48 of these Houses able to provide everything for light, power and intercommunication.

Address the nearest



Lighting Equipment



Power Apparatus



Intercommunicating Systems

*A
National
Electrical
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Western Electric Company

OFFICES IN ALL PRINCIPAL CITIES



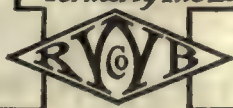
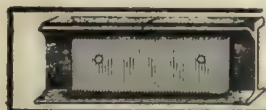
Putting the 9th Avenue, New York, tracks in shape with an RWB Dynamotor

From coast to coast electric railway lines successfully use RWB equipment for building up worn rails, crossovers, etc., bonding, fish plate welding and repairing broken parts of rolling stock. RWB equipment has proved itself of utmost value to hundreds of railways on the line and in the shops. The economy of operation—excellence of work—and portability of the apparatus appeal to every practical maintenance of way engineer.

Our Engineering Department is pleased to furnish complete information on request.

Rail Welding and Bonding Company

formerly The Lincoln Bonding Co.



Cleveland, Ohio.

New York Office
30 Church Street

Chicago Office
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London Representative:

Scholey Construction Company, 56 Victoria Street, Westminster.

Tulc lubricates the first turn of the shaft

THE most desirable lubricant for generator and motor bearings should, like high grade greases, be tenacious enough to cling to the bearing surfaces under pressure and not drip, splash or be thrown from rapidly moving shafts. It should have a durability or wearing quality to make lavish use unnecessary. It should have a normal fluidity sufficient to allow lubrication without requiring the bearing to heat up first.

These properties are *combined* only in Tulc.

At room temperature Tulc lubricates at the first turnover of the armature shaft. On a series of comparative tests Tulc efficiency of lubrication started at 92.95% and attained a maximum efficiency of 93.8%. Other lubricants were from 4% to 7% below their maximum efficiency at the start, and required longer time to attain maximum efficiency than Tulc.

Tulc is compounded to meet the severest requirements of electric railway service. It has proven its value in hundreds of instances. Ask us to demonstrate on your property.

"Overall Specialists"

The service men who work with you on your lubricating problems are not "experts on theories." They put on overalls and get right down to brass tacks—pack your cars—*show* you how and why Tulc should be used. They get results—real money-saving results—99 times out of a hundred. The hundredth time there is no charge for the service.

The Universal Lubricating Co.

Offices: Schofield Bldg. Works: Sweeney Ave.
Cleveland, Ohio



—scientifically and
accurately compounded to
reduce lubricating costs

ERICO RAIL BONDS

HAVE STOOD THE TEST

THEY HAVE GIVEN HUNDREDS OF USERS ENTIRE SATISFACTION

ERICO BRAZED BONDS are in a class by themselves, without a rival; they may be brazed on the side of the head of the rail or on the web of the rail either underneath or around the fish plates.



Type "ET"—Brazed Bond

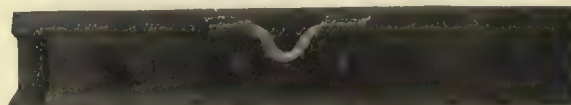
ERICO ARC WELD BONDS all have steel encased terminals electrically brazed to the copper conductor by a patented process, which insures maximum conductivity and durability.



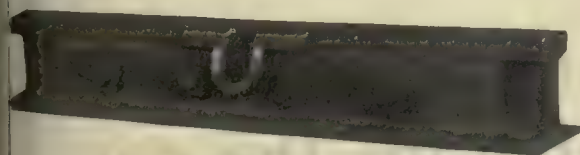
Type "A"—Arc Weld Bond

Long cable bond for use around the fish plates, cross bonding and special work.

Short cable bond for application to head of the rail, and especially adapted to "Weber joints."



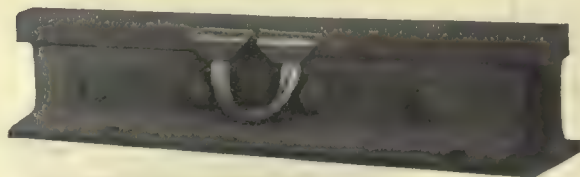
Type "AA"—Arc Weld Bond



Type "AU"—Arc Weld Bond

Ribbon bond for use on head of rail where preference requires a laminated copper ribbon conductor.

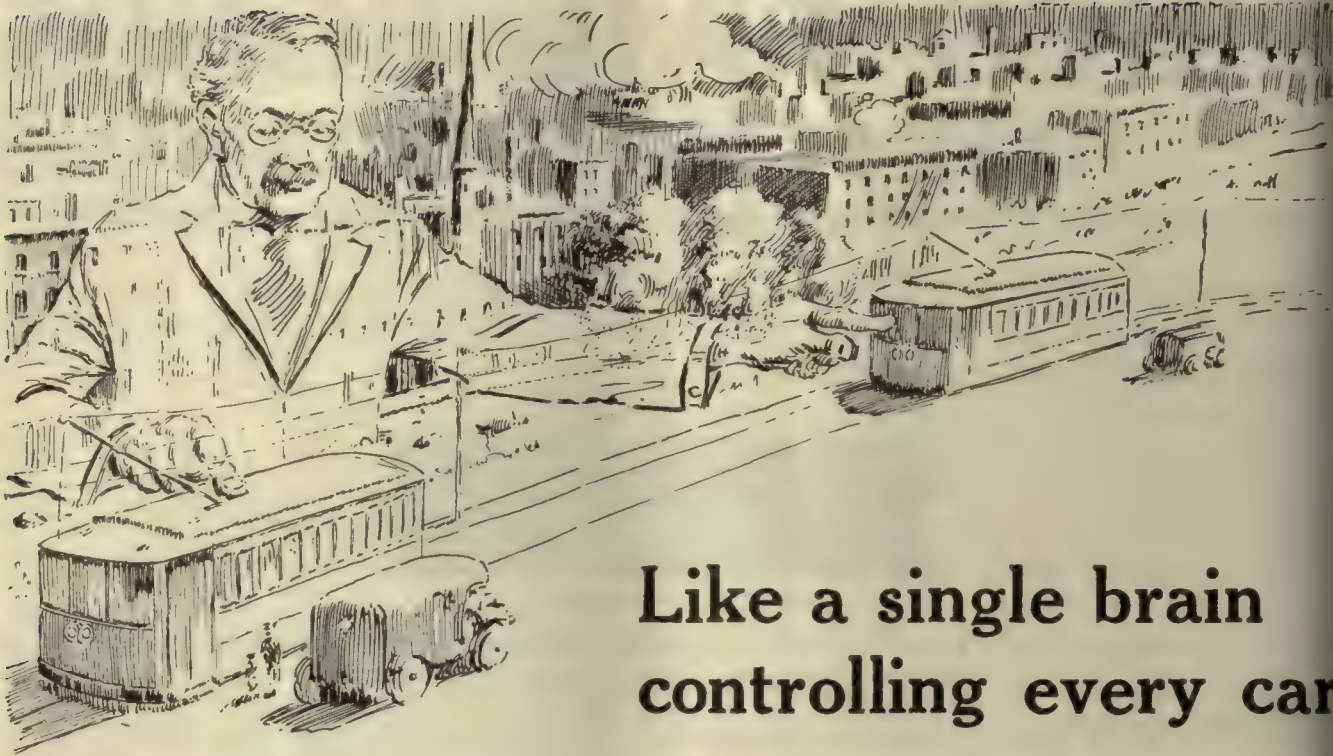
Bond with Drop Forged Steel terminals and twin conductors, permitting a higher arc current in welding them to the rail, thus speeding up their application, and allowing novice to do the work without injury to the bond.



Type "ATF"—Arc Weld Bond

FOR EACH REQUIREMENT AN ERICO BOND TYPE—
FOR EACH TYPE THE LOWEST PRICE ON THE MARKET

The Electric Railway Improvement Co.
Cleveland, Ohio



Like a single brain controlling every car

If you could build a gigantic tower so high that one man could sit therein and personally direct the movements of each car—

You couldn't get any better results than you can by equipping each car with Nichols-Lintern Indicating Signals.

For these flashing rear-end signals make every motorman who sees them instantly aware what the car ahead is going to do.

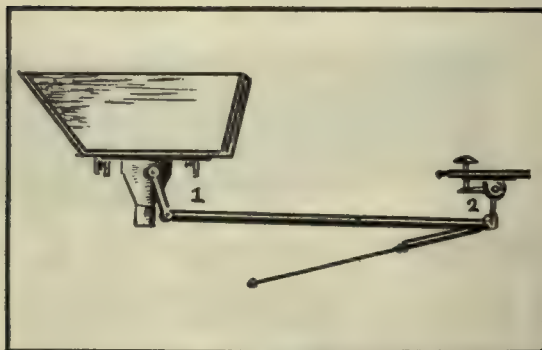
He knows, as soon as the controller handle is moved in that distant car, whether it is going to

stop, start, or go fast or slow.

He knows—and the Chauffeurs know and all kinds of drivers behind the car know—instantly—just whether to stop or start. And rear-end accidents recede into the realm of the impossible.

N-L Indicating Signals not only protect your cars; they also protect your fuel pile by making coasting safer. And they protect your motors, trucks and brakes by eliminating the many false moves made by motormen who don't know what the car ahead is going to do.

—and a single movement of the foot starts the sand and stops the car



Here is all there is to it for the Safety Car—
rapidly and cheaply installed.

That is all there is to it. Just the pressure of a foot when the handbrake is applied. The sand comes out—and the car stops. Air can and will fail—sometimes. Mostly, it seems, just when most needed. No car is completely safe unless the hand brakes are assisted by N-L Mechanical Sanders. Full details and literature on request.

The Nichols-Lintern Company, 7960 Lorain Ave., Cleveland, Ohio

N-L Products Manufactured and Sold in Canada by Railway & Power Engineering Corporation, Ltd., 133 Eastern Avenue, Toronto, Ontario.



Riding on Oil

How many realize that in all railroad travel, either steam or electric, we are literally riding on a film of oil—a thin spread film composed of tiny globules that act as roller bearings between the sliding surfaces of metal.

The life or durability of oil film is proportionate to the vitality of the tiny globules that build it—their *quality*. And this is dependent upon their origin—the basic crudes which forms them.

Galena Oils possess not only the natural body and stamina peculiar to highest quality in basic constituents, but are still further reinforced and strengthened by Galena process in compounding. This extra strength means longer life—greater mileage. It enables them to resist the strains of weight and speed without breaking down. Their superior “body” protects and preserves the bearings. In other words, they give a lubricating service that has never been equalled by other oils.

*“Galena Quality Is Our Bond
and Your Security!”*



Galena-Signal Oil Company

New York Franklin, Pa. Chicago
and offices in principal cities



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Apply Modern Parts to Old Equipment Where Possible

THE task of furnishing more reliable service and of extending the life of railway operating equipment is an ever-present one with the superintendent of equipment and the master mechanic. Thoroughgoing maintenance includes both of these. Reliable service results from keeping all parts in a condition that will obviate trouble. Greater life from the various parts can come only with the use of better materials in construction and better methods in care and assembly and the selection of more satisfactory designs. But in the problems of maintenance the application to old equipment of improvements incorporated in late designs of equipment has not received the attention that it merits.

In an article in this issue John S. Dean discusses some improvements which form a part of most recent motor designs and which can be incorporated in old-type railway motors with beneficial results. For example, a number of modern designs of brush-holders are available for some of the old-type motors and, in cases when the complete brush-holder cannot be used, repairs can be made frequently with such improved parts as springs, ratchets, contact tips and braided shunts.

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Recognizing the fact that the ideal condition for work is that under which the employee receives some tangible recognition for good service, electric railway managers are showing an increasing interest in bonus or premium plans of various kinds. Even where actual bonuses are not offered as rewards for good work, the fundamental principle underlying them is recognized. The problem of the executive is to furnish the most potent incentives to good work. What these incentives will be in each case is an individual problem to determine, but the manager must find them if he is to succeed largely. Probably the most extensive system in use is that employed in various departments of the Milwaukee Electric Railway & Light Company. It was inaugurated on a small scale in 1912 and since has been extended. The United Railways of St. Louis adopted a somewhat similar system in 1917. The plan of paying bonuses for fuel saving has been extensively used in power plants, as by the Manila Electric Railway & Light Company, and for accident reduction on a number of properties. Thus, last Christmas, the Los Angeles Railway distributed about \$90,000 in awards to transportation employees, graduated on the basis of performance in this respect. Many received \$60, and some as much as \$120 for the year.

Money bonuses are not the only way of providing an incentive. The same result has been secured as in Philadelphia by making the men feel that they will participate in the prosperity of the company. A regular profit-sharing system is followed on the Pittsburgh, Butler & Harmony Consolidated Railway & Power Company under the McCahill plan and is included in the new franchises under which the combined urban railways of Paris (France) are now operating.

The general application of the piecework system, of which the bonus system is a kind of offshoot, is more difficult in the transportation departments of electric railway properties than in the shops or in manufacturing or mercantile operations. The difficulty should, however, be a challenge to effort rather than a discouragement. Employees are quick to recognize an interest in their welfare on the part of executives. If this interest takes a practical, but non-patronizing form, the reaction will be prompt and profitable.

Revamping Old Railway Motors

Many Improvements Which Form a Part of Recent Motors Can Be Incorporated in the Old Types to Reduce Trouble and Decrease Maintenance Costs—Manufacturers' Methods Can Be Used to Advantage When Making Repairs

By JOHN S. DEAN

Railway Motor Engineering Department,
Westinghouse Electric & Manufacturing Company

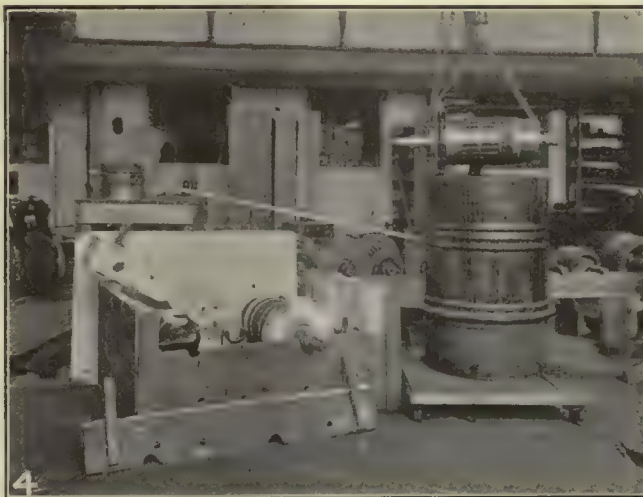
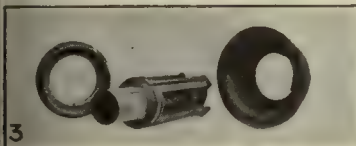
SOME of the older types of non-interpole railway motors have made a commendable record for themselves and have many staunch friends among the operating men in various parts of the country. In some instances, this loyalty is so pronounced that it would require considerable effort to persuade these operators to replace their older motors by the more modern types, even though figures were produced to show a considerable saving in power and maintenance charges. On the other hand, there are a number of operators who, al-

rial should be substituted wherever possible to insure a longer life of these parts.

4. It is necessary to adopt all the improved methods of reconstruction, including up-to-date processes and treatments, and to use greater care in the assembly of the various parts of these motors.

5. All improvements in design of the detail parts which are available should be applied and adapted to older motors.

Some of the more important points that should be



HANDY TOOLS AND IMPROVED DETAIL PARTS REDUCE MAINTENANCE COSTS

No. 1—Handy tools for overhauling.
No. 2—Railway motor armature shaft repaired by electric arc welding.
No. 3—Armature spider with detachable rear-end bell—ring key to lock laminations.

No. 4—Dipping and baking outfit made from discarded material.
No. 5—Armature spider and rear-end bell attached in one piece—ring nut to lock laminations.

No. 6—Main field coil with leads coming from the body of the coil and flat steel spring washer for keeping coils tight.
No. 7—Main field coil with terminals at ends for connecting leads.

though great admirers of these older motors, would no doubt replace them with the more modern motors and by so doing increase the earnings of their company, but the necessary money to make this change-over is not available. Both of these classes and many others now using these older motors are interested in the possibilities of bettering the operation and extending the life of the detail parts of older motors by adopting some of the following ideas which may be applied when these motors are being repaired or overhauled. Some of the important considerations to be followed are:

1. It is essential to provide the necessary and most efficient tools and equipment in order to overhaul and repair these motors in good, workmanlike manner and without danger of possible damage to any of the detail parts.

2. It is desirable to have several spare complete motors and armatures available so that when overhauling motors this work will not have to be rushed through the shops. This will encourage careful, consistent work on the part of the men and will result in a more dependable rebuilt motor.

3. In replacing worn parts, a better grade of mate-

considered in connection with the revamping of these old motors will be given in detail for the benefit of operators and master mechanics who may be interested in making their motors more reliable and better able to meet present-day operating conditions.

GOOD WORKMANSHIP REQUIRES PROPER TOOLS

An extremely important factor in doing any kind of work is that it be done by efficient and reliable mechanics who are provided with the necessary suitable tools and equipment. There is nothing so discouraging to any kind of a workman as to be forced to do a job without the aid of the necessary tools adapted for the work in hand. Of course, the job will be done, but generally in a heartless, shiftless sort of way and when completed it may or may not hold together in service. A good selection of small tools, snug-fitting, open-socket and special-type wrenches, flat and pointed steel bars, pullers, jacks, hoists, etc., placed in the hands of the average workman will do much toward producing very good results in the maintenance and upkeep of railway equipment.

In making repairs or when overhauling motors there

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WHY does a man who is in business for himself work, in general, with more satisfaction and interest to himself than one who works for others? In spite of his longer hours and greater financial risk, he is happier in his work provided that he has the requisite talent for business. The reason for this is obviously that he benefits directly by the results of his efforts and he is able, within limitations imposed by his financial and personal capacity, to carry out his ideas promptly. From this point of view it would seem as if everybody would want to get into business, but it is perhaps fortunate for the industrial condition of the country that only a small part of the population of the country have sufficient business capacity to enable them to be their own employers. Most of them must work for others, but if they are to do their best work they must be furnished an environment as nearly as possible like that which would surround them in their own business.

Recognizing the fact that the ideal condition for work is that under which the employee receives some tangible recognition for good service, electric railway managers are showing an increasing interest in bonus or premium plans of various kinds. Even where actual bonuses are not offered as rewards for good work, the fundamental principle underlying them is recognized. The problem of the executive is to furnish the most potent incentives to good work. What these incentives will be in each case is an individual problem to determine, but the manager must find them if he is to succeed largely. Probably the most extensive system in use is that employed in various departments of the Milwaukee Electric Railway & Light Company. It was inaugurated on a small scale in 1912 and since has been extended. The United Railways of St. Louis adopted a somewhat similar system in 1917. The plan of paying bonuses for fuel saving has been extensively used in power plants, as by the Manila Electric Railway & Light Company, and for accident reduction on a number of properties. Thus, last Christmas, the Los Angeles Railway distributed about \$90,000 in awards to transportation employees, graduated on the basis of performance in this respect. Many received \$60, and some as much as \$120 for the year.

Money bonuses are not the only way of providing an incentive. The same result has been secured as in Philadelphia by making the men feel that they will participate in the prosperity of the company. A regular profit-sharing system is followed on the Pittsburgh, Butler & Harmony Consolidated Railway & Power Company under the McCahill plan and is included in the new franchises under which the combined urban railways of Paris (France) are now operating.

The general application of the piecework system, of which the bonus system is a kind of offshoot, is more difficult in the transportation departments of electric railway properties than in the shops or in manufacturing or mercantile operations. The difficulty should, however, be a challenge to effort rather than a discouragement. Employees are quick to recognize an interest in their welfare on the part of executives. If this interest takes a practical, but non-patronizing form, the reaction will be prompt and profitable.

Revamping Old Railway Motors

Many Improvements Which Form a Part of Recent Motors Can Be Incorporated in the Old Types to Reduce Trouble and Decrease Maintenance Costs—Manufacturers' Methods Can Be Used to Advantage When Making Repairs

BY JOHN S. DEAN

Railway Motor Engineering Department,
Westinghouse Electric & Manufacturing Company

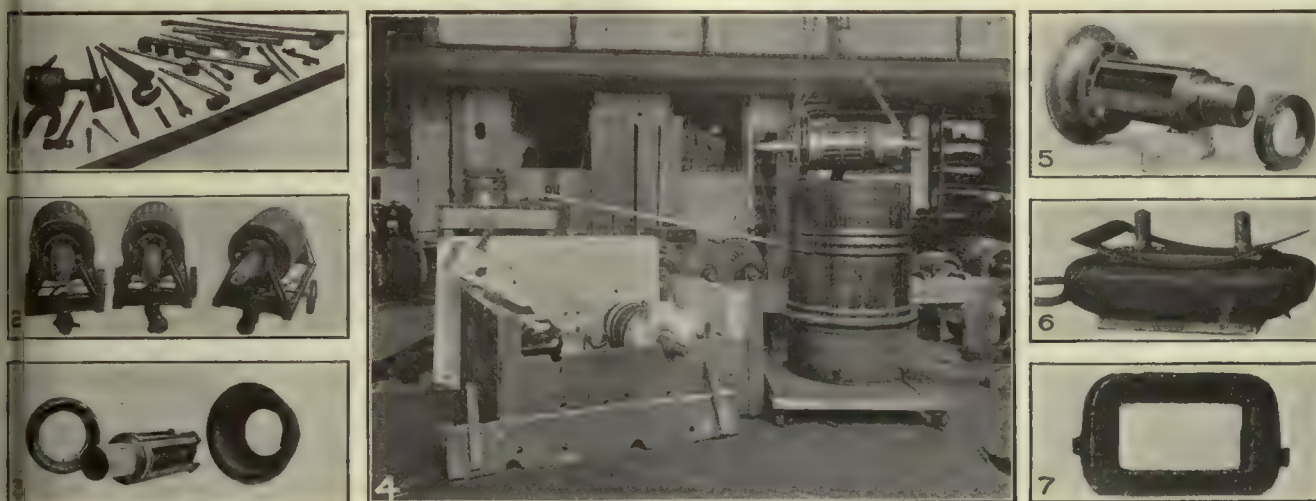
SOME of the older types of non-interpole railway motors have made a commendable record for themselves and have many staunch friends among the operating men in various parts of the country. In some instances, this loyalty is so pronounced that it would require considerable effort to persuade these operators to replace their older motors by the more modern types, even though figures were produced to show a considerable saving in power and maintenance charges. On the other hand, there are a number of operators who, al-

rial should be substituted wherever possible to insure a longer life of these parts.

4. It is necessary to adopt all the improved methods of reconstruction, including up-to-date processes and treatments, and to use greater care in the assembly of the various parts of these motors.

5. All improvements in design of the detail parts which are available should be applied and adapted to older motors.

Some of the more important points that should be



HANDY TOOLS AND IMPROVED DETAIL PARTS REDUCE MAINTENANCE COSTS

No. 1—Handy tools for overhauling.
No. 2—Railway motor armature shaft repaired by electric arc welding.
No. 3—Armature spider with detachable rear-end bell—ring key to lock laminations.

No. 4—Dipping and baking outfit made from discarded material.
No. 5—Armature spider and rear-end bell attached in one piece—ring nut to lock laminations.

No. 6—Main field coil with leads coming from the body of the coil and flat steel spring washer for keeping coils tight.
No. 7—Main field coil with terminals at ends for connecting leads.

though great admirers of these older motors, would not doubt replace them with the more modern motors and by so doing increase the earnings of their company, but the necessary money to make this change-over is not available. Both of these classes and many others now using these older motors are interested in the possibility of bettering the operation and extending the life of the detail parts of older motors by adopting some of the following ideas which may be applied when these motors are being repaired or overhauled. Some of the important considerations to be followed are:

1. It is essential to provide the necessary and most efficient tools and equipment in order to overhaul and repair these motors in good, workmanlike manner and without danger of possible damage to any of the detail parts.

2. It is desirable to have several spare complete motors and armatures available so that when overhauling motors this work will not have to be rushed through the shops. This will encourage careful, consistent work on the part of the men and will result in a more dependable rebuilt motor.

3. In replacing worn parts, a better grade of mate-

considered in connection with the revamping of these old motors will be given in detail for the benefit of operators and master mechanics who may be interested in making their motors more reliable and better able to meet present-day operating conditions.

GOOD WORKMANSHIP REQUIRES PROPER TOOLS

An extremely important factor in doing any kind of work is that it be done by efficient and reliable mechanics who are provided with the necessary suitable tools and equipment. There is nothing so discouraging to any kind of a workman as to be forced to do a job without the aid of the necessary tools adapted for the work in hand. Of course, the job will be done, but generally in a heartless, shiftless sort of way and when completed it may or may not hold together in service. A good selection of small tools, snug-fitting, open-socket and special-type wrenches, flat and pointed steel bars, pullers, jacks, hoists, etc., placed in the hands of the average workman will do much toward producing very good results in the maintenance and upkeep of railway equipment.

In making repairs or when overhauling motors there

are times when this work must be rushed through the shop so as to get the required number of cars out on the road to handle the rush-hour crowds. Granted that special rush jobs are sometimes forced upon the shop and cannot be avoided, there are instances where this method of making repairs becomes a habit with operators and all work is handled in this manner, resulting in establishing a standard of poor workmanship, which tends to increase the ultimate maintenance expense. A motor repaired under these conditions is only a make-shift job in many cases, and is very likely to be back in the shop again in a short time for other troubles that should have been detected when in for repairs the first time. It is needless to say that this oversight or apparent neglect on the part of the workmen is largely due to lack of time. This condition can be almost entirely remedied and, further, cars can be put back in service quicker by having extra motors to replace those taken from the cars for repairs or for overhauling. In the case of the split type of motors a number of extra armatures also greatly facilitates repairs and replacements.

In removing motors from the trucks some operators consider it advisable to keep the axle caps so marked that they go back on the same motor from which they were originally taken. Further, the axle bearings, if they are still in good running condition, are wired onto the axle in their original location. It is the practice of other operators wherever possible to have the partly worn pinion put back on the new or repaired motor on the same axle so that the original gear and pinion again work together. These precautions have been found to work out to advantage, as better fits are obtained which tend to reduce friction and noise of the car. After being removed for repairs the motor should be thoroughly blown with compressed air, and the surface scraped and cleaned of all dirt and grease. The motor is then taken apart and the work of overhauling is done in the various shop departments.

HEAT-TREATED SHAFTS PREVENT TROUBLE

Worn and damaged shafts are usually repaired by means of the arc-welding process and if carefully done by experienced workmen this has been found to be quite successful, although it is well known that the structure of the steel is more or less weakened by this process. On properties that have considerable shaft trouble this condition can be greatly helped by the adoption of heat-treated shafts that are very much tougher and have approximately 60 per cent higher elastic limit than the ordinary axle steel shafts. These shafts have a tendency to wear less at the journals and will stand much more severe abuse under heavy loads, and are less likely to break. When using heat-treated shafts it is not advisable to do any electric or gas welding on them unless they are re-heat-treated after being welded.

Some of these older motors tend to develop loose iron on the spiders of the armatures, which some operators believe is largely responsible for broken armature leads. In a great many cases it will be found that these spiders are used in connection with a detachable rear-end bell generally made of cast iron with the laminated core iron held under pressure on the spider by a ring key locking device. Experience has shown that these end bells work loose, and in some cases the ring key springs out of place, thus allowing the laminations to move on the spider. An improved construction of spider that will overcome this trouble has the spider and rear-end bell

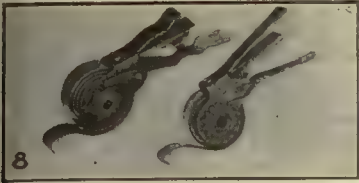
cast in one piece made of malleable iron or steel, and with a ring nut at the commutator end threaded on the spider to hold the laminations under pressure. When this design is used in connection with old laminations it is advisable to have the spider furnished machined at the fit of the iron, from 0.010 to 0.012 in. over size, so that the old iron will be a tight driving fit on the spider. There may be some objections to the spider and end bell cast in one piece as it requires a more expensive renewal charge when the end bell is broken and needs replacement. But experience has shown that with this new type of construction made of malleable iron the end bell is not so readily broken and consequently requires less frequent renewals. The benefit derived from this more rigid construction more than offsets the anticipated objection.

USE GOOD GRADE MICA

If the commutator is worn down and needs refilling with a complete set of new segments, care should be taken in the assembly to use a good grade of properly treated and built-up mica cones or V-rings, and to tighten the commutator while not under pressure to secure a good solid job. It is advisable to consider the use of malleable iron or steel V-rings and spider if these parts have given trouble in service due to cracking or breaking. If the commutator is not worn out and only needs truing up, this should be done in a lathe after the armature is wound and soldered. In doing this work care should be taken not to cut down the width of the commutator neck, as this would reduce the contact area of the leads soldered into the commutator and might result in their heating up and becoming loose in service. After turning and truing up the commutator some operators grind its face, using a fine abrasive stone held in the tool post of the lathe. This gives a smooth surface and tends to increase the life of the commutator and the carbon brushes. It is considered good practice to round off the edges on the face of the commutator as this helps to keep down flashing. The mica should be under-cut about $\frac{1}{8}$ in. and all particles or slivers of mica in the under-cut grooves removed. The insulation over the front V-ring should be thoroughly coated with a good grade of insulating varnish.

In rewinding, correctly shaped coils should always be used, thus permitting the winding operation to be made with the least abuse to the coils to get them down in place. There is a tendency to use a cheap make of coils which are poorly formed and lacking the required insulation at their weak points. When being wound these coils require more or less pounding and abuse and result in a finished armature that will soon break down in service. This is poor economy, as coils of a higher first cost which are properly formed and insulated will make a much easier winding job and will give a better armature that will stay out on the road. In connecting the windings, information as to the throw of the coils and the leads should be checked carefully with the winding diagrams furnished by the motor manufacturer.

If there is a tendency for the armatures to run hot in service and throw solder from the commutator necks it is advisable to solder these leads with a pure tin solder instead of the ordinary half-and-half solder, as the tin solder will stand higher temperatures and will not soften as readily, thus reducing the possibilities of the leads becoming loose in the neck. An acid flux should not be used in soldering. Alcohol and rosin make a good flux and will not damage the insulation.



BRUSH-HOLDER AND ARMATURE BEARING MUST BE KEPT IN GOOD CONDITION

No. 8—Brush-holder spring tension fingers with various detail parts completely assembled—at left, old type; at right, new type.

No. 9—New design brush-holders for old-type motors.
No. 10—Automatic temperature control for babbitting pots.

No. 11—Solid type pinion end armature bearing.
No. 12—Split type pinion end armature bearing.

While soldering the pinion end, the armature should be raised from 6 to 8 in. above the commutator to prevent the solder from running into the windings back of the commutator neck, as this will result in short circuits. Still better results will be obtained by doing the soldering at the side of the commutator instead of on the top.

BAND HOT TO SECURE TIGHT ARMATURES

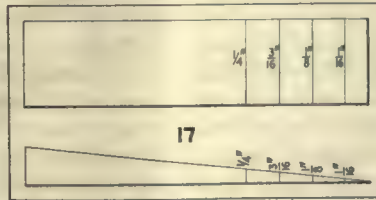
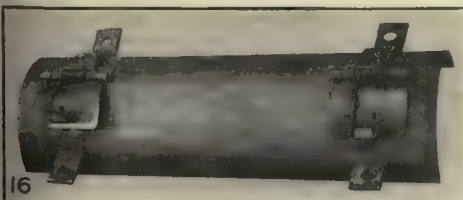
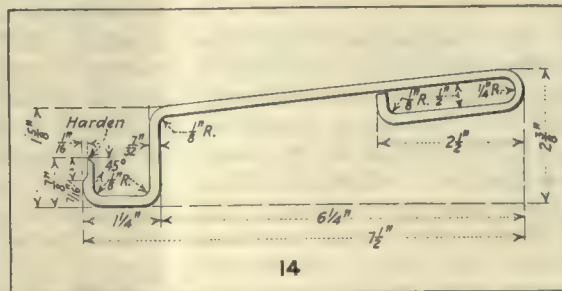
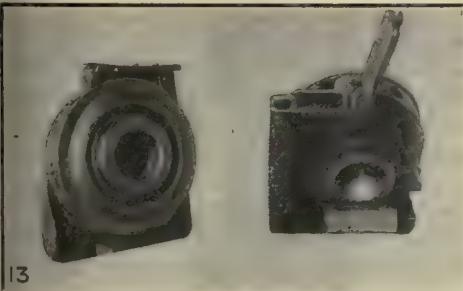
Banding armatures while hot gives a much tighter and more durable banding job, as it allows the coils to be pulled tightly down into the slots. It is preferable to use a high grade of tinned steel banding wire. If these bands are soldered with pure tin solder, instead of the ordinary half-and-half solder, they will hold together better in service, as the tin solder will stand higher temperatures before it will soften and allow the individual band wires to slip and become loose. Narrow strips of tinned sheet steel about 0.012 in. thick placed under the core band entirely encircling the armature, to which the band wires are soldered, strengthen these bands and reduce the tendency for them to become loose.

When the armature is completed, either dipping or rolling in a good grade of insulating varnish and baking at a temperature of from 95 to 105 deg. C. will increase its usefulness, as this will: (1) Fill up all the cracks

in the insulation on the coils opened up during the winding process, and keep out the dirt and moisture; (2) tend to hold the coils solid in the slots, thus reducing vibration, and (3) form a good insulating coating over the entire surface of the armature, which reduces surface creepage.

Operators following the above practice report an increase in the life of their armatures, this being especially noted during the winter season when the equipment is subjected to severe moisture, water and snow conditions.

It is considered best practice in connection with all modern motors, and is recommended for old motors, to use cables coming out of the body of the coil instead of the heavy brass terminals to make the wiring around the frame connections. The main objections to the use of terminals is that they are more likely to break off due to vibration, or to develop loose connections which finally burn off the leads. Another disadvantage is the difficulty of properly insulating these terminals after the connections are made. Field coils should be well insulated and then dipped in a good grade of insulating varnish and baked. The dipping and baking should be repeated several times. Impregnating coils in an asphaltum gum further improves the insulation and makes a solid, compact coil that will better resist breakdowns.



VARIOUS TYPES OF HOUSINGS AND DUST SHIELDS FOR RAILWAY MOTORS

No. 13—Tap bolt type housing for split frame motor.
No. 14—Cold-rolled steel brush-holder spring tension adjuster.

No. 15—Through bolt type housing for split frame motor.
No. 16—Sheet steel axle dust shield fitted with inspection holes.

No. 17—Hardwood distance spacer for spacing brush holders from commutator.
No. 18—Malleable iron adjustable axle collars with double adjusting bolts.

Porcelains on the brush-holders should be kept clean and tight on the pins to prevent creepage of the current to the ground. If the moving mechanism becomes screechy and stiff, a little signal oil should be added to the moving parts. When repairs are necessary, the improved parts such as steel spiral springs, fifteen-tooth steel ratchet, flat contact tips and the heavier flat braided shunts soldered to the brush-holder castings should be used, as these parts tend to give longer life and better service. Pressures should be adjusted to approximately 5 to 6 lb. per finger. However, if there is a tendency for the motor to flash in service it is advisable to increase this pressure to approximately 8 to 9 lb. per finger. Various modern designs of brush-holders are available for some of the older type motors and their use is recommended. Where these modern-type brush-holders have been used in place of the old original holders, better results have been obtained in connection with the operation of these old motors.

All dirt and grease should be cleaned from parts of the motor frame inside and outside, and the drain holes in the bottom of the frame should be kept open. After thoroughly cleaning, the inside of the frame should be painted with an air-drying insulating varnish. On split motors the surfaces at the split and at the housing or bearing seats should be well cleaned, removing all burrs and high spots by means of a file.

In replacing field coils sufficient spacing washers, preferably of sheet steel, should be used under the coil to insure a tight fit of the coil. In addition to the washers, the use of a flat steel spring washer is recommended to prevent coils from vibrating and chafing which would finally damage the insulation. These washers and springs should be temporarily taped to the field coil to prevent them from working out of place while the coil is being assembled on the pole. The surface of the poles and pole seats should be thoroughly cleaned and all high spots removed by filing before putting together.

Poles may be driven into place by means of a block of wood or a chunk of babbitt, but should not be pounded with a sledge. When pulled up tight these may be tested by hitting lightly with a hammer and noting the sound. Under the heads of all tap bolts and nuts on stud bolts used to hold the poles in place a lock washer should be used to insure that these parts will not work loose in service.

The pads or seats for the brush-holders should be cleaned off and all burrs removed and the repaired or new brush-holders securely clamped in place. In connecting up the field coils reference should always be made to the winding diagrams furnished by the motor manufacturer, which give the correct method of doing this work. After coils are in place and temporary connections are made, the polarity of the various coils should be checked to insure the flow of the current through the coils in the proper direction to produce the required magnetic field strength.

The soldering of all connections to the field coils and wiring around frame leads should be made by or under the direction of some one man experienced in this work to insure a good electrical job. All leads should be cleaned and tinned before soldering. Brass or copper sleeves should be used on the brush-holder leads and on field coil leads when terminals are used on the field coils. If, for any reason, sleeves cannot be used, the wires of the cable should be soldered together. When cables are in place all set screws on the field coil ter-

minals and the brush-holders should be drawn up tight and locked. The field-coil terminals should then be well insulated and shellacked and painted. Leads should be well cleated and protected by wood, fiber or rubber bushings where they pass through the motor frame. The leads coming out of the motor frame should be marked plainly so that the workman will not have any difficulty in making the right connections to the car wiring.

ARMATURE BEARINGS NEED THOROUGH CLEANING BEFORE TINNING

Armature bearings if made of bronze should be carefully tinned and lined with a good grade of tin base babbitt metal. In doing this work the bearing shell should be thoroughly cleaned before tinning. While pouring the babbitt metal its temperature should be kept at from 460 to 482 deg. C. in order to get the best results. After bearings are lined, if the job has been well done the finished bearing will sound with a clear metallic tone when hung up by a wire and tapped with a piece of metal. Malleable-iron bearing shells if tinned before lining with the babbitt will tend to prevent the lining of babbitt from cracking away from the shell, and will give very much longer life in service. On some of the older types of motors, the pinion end bearings were split to facilitate repairs. Where the split type of bearings are used, longer life and better service will be obtained by replacing them with the one-piece solid type of bearing. All bearings should be provided with oil grooves and have the edges at the window chamfered to allow the oil to find its way into the surface of the journal throughout the bearing. If bearings are loose in the bearing seat it may be necessary to use an over-size shell. Some operators have used a shim of thin sheet iron to tighten loose bearings and report fairly good success. Other operators have expanded their bronze bearing shells by forcing a mandrel through them, to make them tight in the housings, and have found this to be quite successful.

CLEAN OIL WELLS CAREFULLY

Housings in split-frame motors should have a good clamping fit between the two halves of the motor frame. After the two halves of the frame are clamped together on the housing the clearance at the split as measured at the commutator and pinion end should be from 0.008 in. to 0.012 in. If this clearance is not obtained, the housings may be shimmed up with strips of canvas treated in white lead. The oil wells should be thoroughly cleaned out, removing all old soggy waste and dirt, and the oil box lids lined with felt should be made to close positively by means of a stiff spring to keep dirt and water from getting into the oil well. Housings should be securely doweled as an emergency precaution. If the threads in the tap-bolt type housings are worn a longer bolt will sometimes hold better as it will be found that the threads at the bottom of the tapped holes have not been damaged. Where the old tap-bolt type of housings are too badly worn to be used, these should be replaced with the new through-bolt type of housings available, for some of the older types of motors. If the housing seats in the frame are badly worn, an oversize housing should be used to secure a good tight clamping fit. This design of housing fitted with through bolts is now being used by a large number of operators and has done much to reduce the maintenance cost of these parts.

After the armature is assembled in the frame it

should be carefully checked for the proper air gap and the correct end play. If there is any question as to the air gap being too small, it may be due to the poles not being pulled down tight on their seats. If for any reason the armature end play is excessive this can be remedied by placing thin brass or fiber washers on the shaft between the bearing and wiper rings, or by the use of a steel collar placed over the bearing shell between the bearing collar and the housing. All armatures to give satisfactory operation should have approximately $\frac{1}{8}$ in. initial total end play.

With the armature in place, the brush-holders should be carefully checked and adjusted with respect to the following points:

1. Brush-holder box should line up parallel with the commutator bars.
2. Distance from center line of one brush-holder to the center line of the other brush-holder should be equal to one-fourth the circumference of commutator.
3. Brush-holders should space $\frac{1}{8}$ in. to $\frac{3}{8}$ in., preferably $\frac{1}{4}$ in., from the face of the commutator.
4. Carbons should have a smooth sliding fit in the carbon box of the brush-holder.
5. The carbons should be seated on the surface of the commutator, by means of a strip of sandpaper cut the width of the commutator face.
6. A good grade of unplated graphitized carbon brush is recommended and approved by the motor manufacturer.

BE SURE THAT BOLTS AND NUTS CANNOT WORK LOOSE

It is very important that lock washers be used under the heads of all tap bolts and under the nuts of all through or stud bolts. Operators are learning the importance of using special heat-treated bolts in connection with the housings, axle caps and frames of railway motors. These bolts have 60 per cent more tensile strength and are tougher and more reliable than the general "run-of-mine" standard hardware bolts, and thus will stand more abuse and are less likely to stretch or break in service.

Bearings should be packed with a good quality of wool waste which has been saturated in an approved grade of car oil for about twenty-four hours. All bearings arranged for side feed and using oil and waste for lubrication depend upon the capillary or wick action of the waste to carry the oil up to the bearing window. Thus, in this type of bearing to insure clean oil reaching the journal, the oil should be poured into the oil well so it must feed up through the waste. If the oil is poured in on top of the waste the tendency is to flood the inside of the motor and to waste the oil. The normal average height of the oil as gaged in the oil well should be $3\frac{1}{2}$ in. maximum and 1 in. minimum for the armature bearings and $2\frac{1}{2}$ in. minimum for the axle bearings.

After field coils are connected up permanently and the armature is assembled in the motor frame, the field coils should be tested for polarity by connecting *F* plus field lead to the trolley through several grid resistors or a headlight resistor and *F* minus field lead to the rails, and with current passing through these coils check the polarity by means of a compass needle. This same testing circuit may be used to give the motor a running test to check the condition of the bearings. Before doing this, it should be made sure that the bearings are packed and oiled and that the carbon brushes are in

place. To make this running test, connect *A* plus lead to the trolley circuit, *A* minus lead to *F* plus lead and *F* minus lead to the rails. To reverse the rotation of the armature, connect *A* plus to the trolley *A* minus to *F* minus and *F* plus to the rails. Be sure to open the test circuit after the motor has attained a speed of approximately 800 r.p.m. Test the armature and field windings for ground by means of a lighting-out line connected through a bank of lamps, or by means of an alternating-current testing box. If the motor meets all the above tests satisfactorily it can be passed for service as O.K.

HEAT PINIONS FOR INSTALLATION

All pinions should be heated in a tank of boiling water for several hours before applying. (Use $\frac{1}{4}$ lb. of washing soda to 5 gal. of water to prevent rusting.) The pinion bore and taper fit on the shaft should be carefully cleaned and all burrs and high spots removed. Keys should have all sharp corners rounded off and should fit properly. The pinion should be driven in place while hot, using a bar of soft metal. On pinions which drive up on the taper too far, some operators report very good results from the use of a paper liner placed between the pinion and the pinion fit.

When mounting the motor on the truck it should be seen that the axle bearings are in good condition, and that the dowels or keys in the axle caps are securely held in place. In addition to the dowels it is essential that the axle caps should securely clamp the axle bearings to prevent movement and rapid wear. To get this clamping action on old bearings worn on the outside, some operators use thin sheets of fiber at the bearing seat, while others have placed metal shims between the two halves of the bearing at the split. Another scheme used to get the desired clamping action is to machine from $\frac{1}{8}$ in. to $\frac{1}{4}$ in. of metal off the axle cap at the split. Special heat-treated bolts fitted with lock washers will hold the axle caps in place more securely. Axle cap oil wells should be thoroughly cleaned out and the oil box covers put in good condition.

If the gear case has a large clearance at the opening for the axle bearing flange it should be provided with two half rings of felt and the grease box cover should be put in good operating condition. If the gear seats on the motor or the suspension pads on the gear case are worn, it is advisable to place sufficient strips of canvas treated in white lead on the gear-case seats to insure that the case will be drawn up tight by the clamping bolts, thus preventing any movement of the two halves.

In order to increase the life of the axle bearings, it is very desirable to provide a reliable dust shield covering the axle between the axle bearings. This shield should be provided with peepholes to facilitate the inspection of the bearing wear. The inspection holes should be protected by a cover which is kept closed by a strong spring so as to keep out the dust and dirt.

In order to take up the end wear of the motor axle bearings, and to keep the motor in its proper position on the axle, thus preventing the gear from cutting through or otherwise damaging the gear case, it is advisable to use a suitable adjustable type axle collar. A good reliable collar for this purpose is made of malleable iron provided with a double adjusting bolt and having an overhanging lip engaging the axle bearing flange which keeps the dust and dirt from working into the wearing surfaces of the axle bearing.

Convenient Forms Simplify the Making of Cost Records

On Medium-Sized Roads with Limited Office Forces Collection and Preparation of Accurate Data for Costs of Construction and for Maintenance Work Present a Considerable Problem

BY A. J. STRATTON

Assistant Superintendent of Railways,
Eastern Pennsylvania Railways, Pottsville, Pa.

THE head of the maintenance of way department of the medium-sized traction company usually has but little time to devote to extensive office work. There are, however, certain records that for the benefit of all concerned must be compiled. A great deal of this information depends upon the wishes of the management, but some data are necessary for the use of the head of the department. Clerical help is often restricted to the services of a timekeeper or clerk of material and supplies with the joint use of stenographer with some other department. The result is that the head of the department must give a certain amount of time to the collection and preparation of these data.

On properties where costly valuations have been made or where the physical property of the company is carried on the perpetual inventory system, it is of great importance that a record be kept of the new material that goes into the property, its location, and the time of its use. On reconstruction work this may be most conveniently handled by the work order system. Normal maintenance work such as the installation of ties, the surfacing in open track, replacement of parts of special work layouts, painting and repair of bridges, repairs to bonding, and other kindred charges not usually made under work orders may cost more in a year than all of the reconstruction work, but except for the gross cost, the replacement of materials is lost sight of.

Three reports are in use by the maintenance department of the Eastern Pennsylvania Railways covering trackwork, bonding and welding and repairs to bridges and structures. These reports are made daily by the foremen and collected by the timekeeper who checks the material used and the amount of work reported. Every man on the payroll must be included on these reports. Track greasers and other employees working individually are grouped on one report unless the work performed by the individual is of sufficient importance to warrant an individual report. The trackwalker is an example of the latter. When the work reported is covered by a work order the report is filed under the work order number. Maintenance work is filed under line and division. These reports are made for use on a standard 5-in. x 8-in. card file.

REPORTS SUMMARIZED MONTHLY

At the end of the month reports are summarized and a brief narrative report is made to the general manager's office covering the activities of the department for the month. Lists of material are taken from these reports monthly and are grouped for record purposes under the proper division, and at the end of the year a complete report is made covering all changes to physical property.

From an operating standpoint the compilation of these reports has assisted in increasing the efficiency of the various employees. For example, the number of bolts used by trackwalkers increased 300 per cent the month following the use of the daily report. A study of the

Form 101 1000 5-24-21		Eastern Pennsylvania Railways Co.		Company	
Work Order Requisition				W. O. No. _____	
Date March 1 1921				Executive Au. No. 757	
Item	DESCRIPTION OF PROJECT	Charge Account No.	COST		
			Estimated	Actual	
	Reconstruction of tracks 2nd Street, 19th to 23rd Streets, 4750 feet of single track.				
	Engineering and Superintendence	CR-1			
	Grading	CR-4-A			
	Removal of excess Materials	CR-4-B			
	Ballast	CR-5			
	Ties	CR-6			
	Rail, Rail Fastening and Joints	CR-7-A			
	Rail	CR-7-B			
	Rail Joints	CR-7-C			
	Miscellaneous Fastenings				
	Track and Roadway Labor				
	Handling and Delivery of Track Materials	CR-10-A			
	Track Laying	CR-10-B			
	Track Surfacing	CR-10-C			
	Joint Welding	CR-10-D			
	Protection of Work Stations etc.	CR-10-E			
	Miscellaneous Track Labor	CR-10-F			
	Paving				
	Delivery of Paving Materials	CR-10-A			
	Paving Materials	CR-10-B			
	Labor Installing Concrete Base	CR-10-C			
	Labor Paving	CR-10-D			
	Cleaning Up	CR-10-E			
TOTAL					
DIFFERENCE					
To be started Date April 1 1921			To be completed Date 1921		
Reasons and Benefits: Reconstruction necessary on account of deteriorated condition of tracks and pavement, also to comply with new grade and pavement to be established by the city.					
Issued by M. of W. Department			Approved Date 1921		
Estimated by C. E. Brown			Gen. Mgr.		
Approved by J. J. Smith					

FORM OF WORK ORDER REQUISITION

work of several foremen engaged in similar work showed a divergence in the production per man too great to have been influenced by local conditions. It was then possible to give those foremen making the poorer showing more supervision and assistance to raise the product of their gangs to a general average. The work report was not designed to take the place of the time report, but the space in the lower left-hand corner showing the number of men and the rates gives the head of the department an opportunity to check the quantity of work produced against the cost. It also gives him an instant perspective of the work of his department day by day, a view presented by facts alone and unsupported by local color in the shape of a plausible story by the foreman.

All engineers are interested in cost data. Auditing departments are usually ready to co-operate as far as they can, but they look upon this work as being of secondary importance to their routine work, with the result that the desired information is not obtainable until long after the completion of the work. All work of importance should be done under the work order system. The maintenance department of the Eastern Pennsylvania Railways prepares work orders that are given numbers by the auditing department. The main

items on the work order consist of the accounts affected by the proposed work, in the system of accounting used on the property. Accounts involving labor charges are subdivided so that the cost of the labor operation may be segregated and analyzed. The timekeeper's report each day carries the work order number with the account number and the subdivision of the account if such is used.

As the information from the accounting department was received too late to be of immediate benefit the maintenance department devised the plan of keeping a cost record that would give the cost of the work up to the day previous to that on which the information was required. This information is kept in a loose-leaf book and is posted daily from the

in the time report. Joint welding is also a separate consideration. The cost of watchmen and the protection of the public as reflected on the time sheets in the labor cost of temporary crossings, for fire equipment at hydrants, etc., form no inconsiderable item in the cost of track construction in our city streets. Last but not least is the "miscellaneous" subdivision used to cover all of those unexpected expenditures that cannot be estimated by any stretch of the imagination.

Reference has been made to the perpetual inventory system of physical property. It will be noted on the sample work order that no reference has been made to the removal of old track and pavement. This is taken care of on a separate work order retiring the old construction. Thus the new installation is charged directly into plant and equipment accounts.

Form 268-12-22-21

TRACK WORK REPORT

Eastern Pennsylvania Railways Co. M. of W. DEPT. Pottsville Union Traction Co.

Date _____ Location _____ Div _____

W. O. _____ Auth. _____ Class of Work _____

Work Performed

Street Opened _____ Street Closed _____ Joints Repaired _____ Drilling _____

Damaged Rail Replaced _____ Guard Rail Attached _____ New Rail Laid _____

Paving Repaired _____ Sq. Yds. Surfacing _____

Material Used

Rail, new _____ Joint Plates _____ Kind _____ Track Bolts _____

Ties, new _____ Spikes _____ Ballast _____ Tie Plates _____ Tie Rods _____

Cement _____ Sand _____ Crushed Rock _____ Ashes _____

Brick _____ Wood Block _____ Separators _____

Lumber _____ Timber _____

Material hauled away _____

Men Hrs. Rate Actual Time

Give Brief Description of Work

Form 266-8-10-21

Welding, Grinding and Bonding Report

Eastern Pennsylvania Railways Co. M. of W. DEPT. Pottsville Union Traction Co.

Date _____ Location _____ Div _____

W. O. _____ Auth. _____ Class of Work _____

Bonds Applied _____ Kind _____ Special Bonding _____

Joint Plates Welded _____ Kind of Weld _____

Surface Welding at Joints _____ Special Work _____

Joints Ground _____ Sp. Wk. Ground _____

Men Hrs. Rate Actual Time

Give Brief Description of

Form 267-1-3-21

BRIDGE AND STRUCTURES REPORT

Eastern Pennsylvania Railways Co. M. of W. DEPT. Pottsville Union Traction Co.

Date _____ Location _____ Div _____

W. O. _____ Auth. _____ Class of Work _____

Material Used

Lumber _____ Timber _____ Steel Paint _____ Wood Paint _____

Steel _____ Bolts _____ Nails _____ Oil _____ Guard Timber _____ Ashes _____

Red Lead _____ Bridge Ties _____ Rock _____

Roofing Material _____ Sand _____ Cement _____

Give Brief Description of Work

Men Hrs. Rate Actual Time

Foreman

FORMS USED FOR VARIOUS WORK REPORTS

time sheets and from requisitions for material. Not only is the actual expenditure included but the man-hours also. From an estimating standpoint the latter is of more value than the former in so far as the labor items are affected. From these data the average rate may be obtained, and in the event of an increase or decrease in labor costs a percentage may be applied to the average rate and the resulting new rate can then be readily applied to the man-hours so that a new result is obtained.

It has been found of great value to subdivide the items involving labor. It is not enough to know that the cost of track and roadway labor on a certain job was \$1.05 per foot of single track. The operation of track laying may be divided into several divisions, all closely related but nevertheless clearly defined, without involving so great detail as to confuse the entire labor account for the job. The first subdivision of track and roadway labor is logically the handling and distribution of materials from the point of storage to the point of use. Track laying and the surfacing of track are two distinct operations, but unless care is used they may be confused

It being quite improbable that in the event of a physical valuation being made at some remote period the book value would be accepted, consequently a careful record is made of all changes to physical property so that should a future valuation become necessary unit prices could be applied to quantities as shown in the perpetual inventory. Work orders are letter size and are filed at the completion of the work, together with the original estimate and supporting data, a complete plan of the work, also sections showing the type of construction, all correspondence, computations relating to paving bills or contract work, copies of all requisitions for material, and at the completion of the work a complete statement from the auditing department of all the expenses entering into the job. With this information available a reconstruction of the work for valuation purposes may be made at any time by applying such unit prices as may be desirable to use.

The use of the various forms also simplifies the clerical work necessary, provides a means for accurate checking of costs when the work is completed and decreases the probability of errors.

A More Substantial Substitute for Canvas Curtains on Snow Sweepers

MOST snow sweepers are equipped with canvas curtains to prevent the snow from being thrown too great a distance from the tracks. This scheme of restricting the throw of the rotary brushes has not been very satisfactory, however, on the Youngstown (Ohio) Municipal Railway. Hence, A. B. Creelman, master



WOOD SLATS REPLACE CANVAS SNOW PLOW CURTAINS

mechanic, devised the curtains pictured herewith. These consist of four lengths of ordinary fender support chain to which are bolted wood slats. No opportunity has been afforded to give these new curtains a real tryout, but it is believed that they will be much more effective and durable than the canvas curtains displaced.

Safety Device for Circular Saws

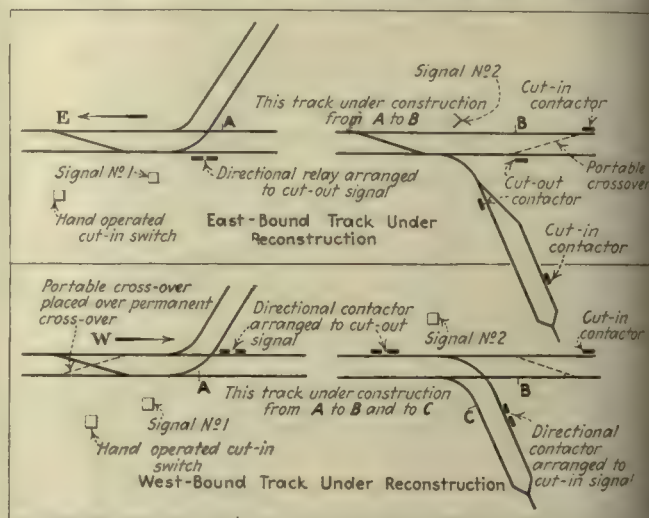
ACCOMPANYING illustrations show a safety device which has been applied to several of the saw tables in the shops of the Third Avenue Railway, New York, N. Y. This device is the invention of Thomas E. Jenkins, mill foreman for the railway, and its use is proving of particular benefit in reducing accidents.

The device consists of a hinged metal piece which fits into the saw table around the circular saw. This is hinged at one end and in its normal position the end farthest from the hinge projects above the saw table slightly. It is held in its raised position by a small spring which acts on the underside of the guide. When lumber is being sawed the weight of the material forces the device down so that it is flush with the top of the saw table. When the cut has been finished the end of the board slides off the end of the safety device and this rises, so that the material cannot again be drawn back and engage the saw. If the material is

drawn back toward the operator it will be forced to the side the distance that this projects out, so that there is no danger of accident. The accompanying drawing and photographs show how the device is installed.

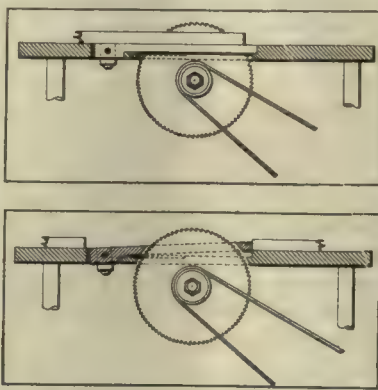
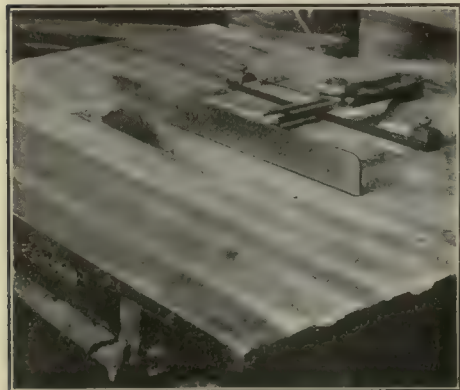
Temporary Signal Installation Saves Flagman During Construction

IN THE reconstruction of track during last summer, the Youngstown Municipal Railway, of which J. B. Stewart, Jr., is general superintendent, found that the single-track operation necessary was greatly expedited and the cost of a flagman eliminated through the temporary installation of Nachod signals. The manner in which the signals were used is shown in the accompanying diagrams. One shows the location of the signals while the eastbound track was under construction and cars were operated in both directions over the west-bound track and the other shows the signal installation



DIAGRAMS SHOWING HOW TEMPORARY SIGNAL INSTALLATIONS WERE USED TO PROTECT TRAFFIC DURING TRACK RECONSTRUCTION

for the opposite condition, that is, while the westbound track was under construction. On account of the three lines of traffic, some signaling or flagging protection was absolutely necessary and the automatic signals made a nice economy. The hand-operated cut-in switch shown was used instead of an overhead contactor and operated by a switchman, because it was necessary to have the switchman there anyway to look after the portable crossover and because the electric switch on the branch-off at this point was disconnected and the switchman also handled this.



AT LEFT, VIEW OF SAFETY DEVICE AS INSTALLED IN SAW TABLE. IN CENTER, TOP, VIEW OF SAFETY DEVICE PRESSED DOWN BY MATERIAL. BOTTOM, SAFETY DEVICE IN NORMAL POSITION. AT RIGHT, MATERIAL AFTER BEING SAWED CANNOT BE DRAWN TOWARD THE OPERATOR SO AS TO MAKE CONTACT WITH THE SAW



LAKESIDE POWER PLANT, MILWAUKEE. THE COAL PREPARATION BUILDING IS AT THE LEFT

Milwaukee's Powdered Coal Station

First Great Generating Plant Equipped for Burning Pulverized Fuel in Operation for a Year—Station with Ultimate Capacity of 200,000 Kw. Has Many Interesting Features—High Over-All Economy Expected to Be Realized with Use of Low-Grade Coal

OUTSTANDING among many features of the new 200,000-kw. Lakeside generating station of the Milwaukee Electric Railway & Light Company is its design and equipment from the ground up for burning powdered coal. It is the first large railway and central station power plant to be so equipped and therefore marks a development the outcome of which is of greatest interest to large power generation companies generally. The decision to make this largely untried departure from common practice was based primarily on tests made on boilers equipped for burning pulverized fuel at the company's Oneida Street station in Milwaukee. The results of this test, related in *ELECTRIC RAILWAY JOURNAL*, page 473, Vol. 55, indicated that better efficiency could be expected with pulverized fuel than with stokers, particularly if a plant were built and equipped specifically for this kind of firing.

The new Lakeside power plant has now been in continuous operation since Dec. 15, 1920. Despite the fact that it went into service with a new organization of men largely unacquainted with pulverized-fuel systems, no interruptions attributable to the mechanical equipment have been experienced up to the present time. The company officials feel that the test results so far obtained give promise that the specified thermal efficiency of the station will be reached when the operating and design problems incident to such a radically new system have been mastered. The station economy expected of Lakeside will be that which will result from combined boiler, furnace, superheater and economizer efficiency of 88.15 per cent, using Illinois coal of approximately 11,000 B.t.u. heat value as received.

Other features of the new Milwaukee power plant are the unique circulating water system and \$400,000 rubble mound in Lake Michigan; the location of the plant in a deep excavation to reduce the lift of circu-

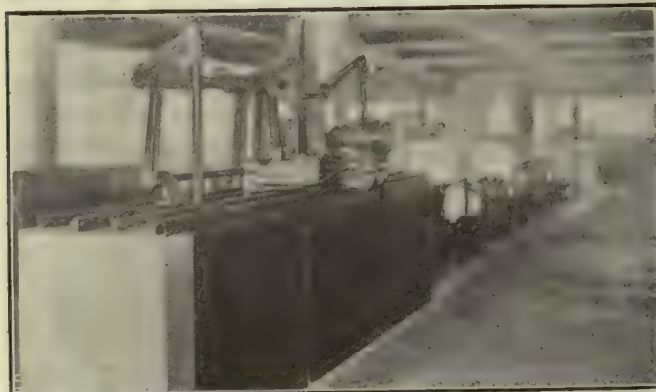
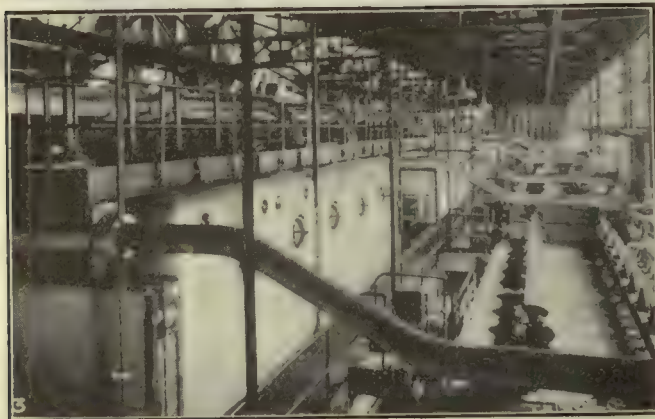
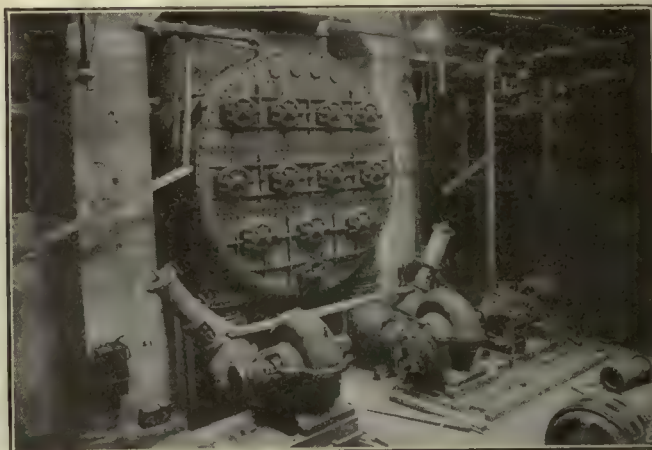
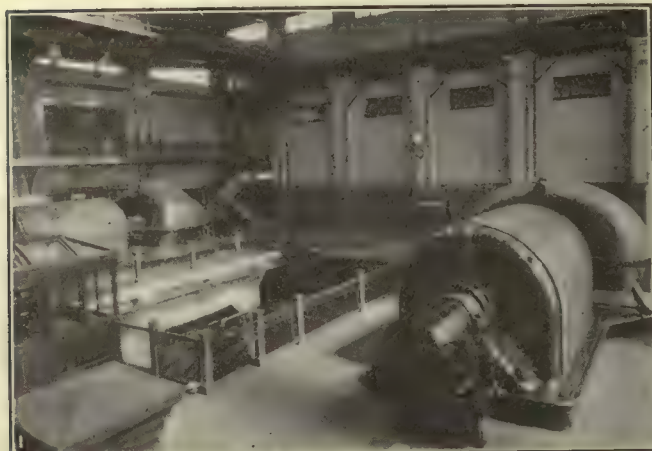
lating water with the attendant construction difficulties, and the practical completion of the first section of the station in less than a year. The ultimate development of the plant will reach an hourly capacity of 160,000 kw. with an installed capacity of 200,000 kw., 40,000 kw. being the initial installation and two additional 80,000 kw. sections the future plan. The final boiler capacity will be three times the initial installation and will comprise twenty-four 1,306-hp. boilers.

Work has just recently been started on the installation of an additional turbo-generator unit. This will be of 30,000 kw. capacity, and as it will be run in conjunction with one of the two 20,000-kw. units, no additional boiler capacity is needed for the time being.

The following matter descriptive of the new plant is abstracted from three papers presented before the Technical League of the Milwaukee company by R. H. Pinkley, John Anderson and G. G. Post, respectively engineer of way and structures, chief engineer of power plants and electrical engineer.

Owing to the rapidly increasing demand for electrical energy in the Milwaukee district, the Milwaukee Electric Railway & Light Company found it necessary, in 1915, to begin plans for increasing its power producing capacity. A study made at that time indicated that the best plan would be to construct an entirely new power plant which would provide the necessary increased capacity and would ultimately relieve the existing power plants of the major portion of their load. The general plan was to make provision for a 200,000-kw. plant, building the first section for 40,000 kw. Due to the experience with the old plants located in the heart of the city with an inadequate water supply, restricted coal and ash handling facilities and where smoke is objectionable, a suburban location was considered preferable. After canvassing the district for the most suitable

Here and There in the Lakeside Plant



No. 1. Two 20,000-kw. turbo-generators were the initial installation in Lakeside plant.

No. 2. End view of condenser, showing turbine-driven and motor-driven circulating water pumps.

No. 3. Rear view of the boilers, showing fuel pipes, main steam headers and connections to economizers.

No. 4. Operating levels in center aisle of the boiler room.

No. 5. Feeder group oil switches with structure and mechanism as the floor level, easy to get at.

No. 6. Main operating switchboards located in switch house.

No. 7. Inclined belt conveyor running from crusher house to the raw coal storage bunkers.

No. 8. Belt conveyor drive house located at the center of the incline.

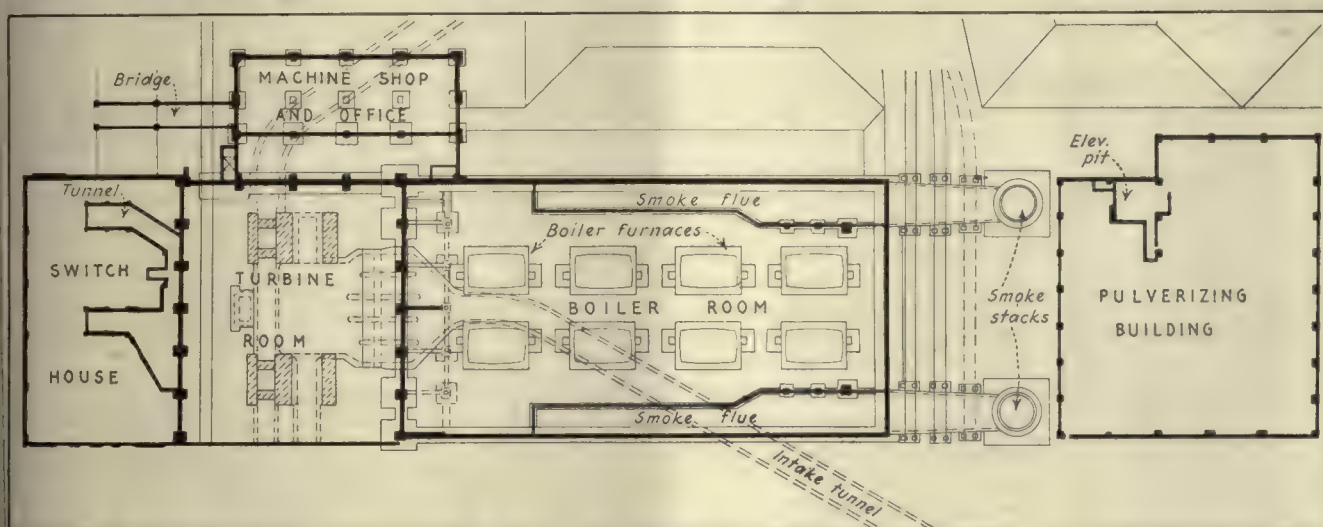
location, the Lakeside site, situated on the shore of Lake Michigan about 1 mile south of the south city limits of Milwaukee, was chosen. This site is not far from the electrical center of gravity of the company's load and is adjacent to the most important industrial centers in the district served.

Accordingly, in 1916, land was purchased, including 6,000 ft. of frontage on Lake Michigan and a railroad right-of-way connecting to the Chicago & Northwestern Railroad. Up to that time coal for power purposes was being received by the company entirely by lake transportation so that coal docks and a protecting harbor were considered essential features of the plant.

Owing to the conditions occasioned by the World War, in 1917 it was found impossible to go ahead with the project. The company set aside all thought of continuing and directed its efforts toward getting the utmost capacity out of every piece of the existing generating equipment. But at the end of 1919 the increased load

of the operating engineer and of the testing department. There is also found there a fine room, 47 ft. x 52 ft., for the use of the Employees' Mutual Benefit Association. To the east of the power plant is the pulverizing plant, 108 ft. x 125 ft., its east end reaching to the edge of the bluff at the Lake Shore. It is equipped to do pulverizing for the entire plant when completed. The stacks rise direct from the ground from a location between the boiler room and the pulverizing plant, each reached from the boiler room through an underground flue 8 ft. x 11 ft. average size. To the north of the pulverizing plant, distant about 400 ft. from it and placed against the side of the bluff to take advantage of the slope to secure a gravity flow for the coal, is the car-dumping and coal-crushing plant, from which the coal is carried by a covered belt conveyor to the pulverizing plant. This also has been planned to meet the requirements of the completed 200,000-kw. plant.

The ultimate 200,000-kw. plant will require water for condensing purposes at a rate of 360,000 gal. per minute



PLAN OF MAIN BUILDINGS OF POWER PLANT

made it imperative to begin again. Accordingly, on Dec. 22, 1919, orders were issued to proceed with the plans and rush through the construction of the first section of the new plant, including two 20,000-kw. turbine units, so as to have this capacity in readiness, if possible, to deliver power on Nov. 1, 1920. The entire engineering, designing and drafting work was done by the company's own forces and the work was executed under the direction of the company's engineers, the company acting in the capacity of general contractor and sub-contracting the various items of the work.

The power plant proper is made up of three parts—the switchhouse, the turbine room and the boiler room. The switchhouse at the west end is directly joined to the turbine room, but separated by a solid wall except for necessary door openings and a glass panel over the bench board on the second floor. The south wall of the turbine room is a temporary one to be removed when the second unit is added. An auxiliary bay forms the connecting link between the turbine and boiler rooms, separating them to a certain extent but not interfering with the unity of design of the whole structure.

Just north of the turbine room is a two-story structure, 95 ft. x 52 ft., on the lower floor of which is the repair shop, completely equipped to handle work required maintaining such a plant. On the second floor are the

or 518,000,000 gal. per twenty-four hours. In order to secure this supply from the lake without going out into deep water, it was decided to build a rubble mound inclosure extending approximately 485 ft. out from the shore and 850 ft. long to provide, in effect, a pond of still and clean water for this purpose. It is the function of the rubble mound to break the force of the waves and prevent rubbish, sand and ice from washing into the intake, thus permitting the intake tunnel to be terminated near the shore line. The discharge tunnel is arranged to discharge either inside or outside of this basin, so that in the winter time the warm discharge water can be used to prevent the basin from freezing. This rubble mound is designed with a height of 8 ft. from the normal surface of the water, with a width of 10 ft. on the top and a slope of 2 to 1 on the lake side and 1½ to 1 on the inner face. As the outer wall is in over 15 ft. of water, the base at the maximum point is 91 ft. wide. The core of this rubble mound consists of quarry run limestone having a minimum size of 3 in.; the cover stones weigh 500 lb. up to 15 tons each. All stone except the inner core are of granite from Wisconsin quarries and are keyed in rubble fashion. There was required in the construction of this rubble mound more than 80,000 tons of stone, the core stone being placed by dumping from

scows and the heavier stone being handled by derricks mounted on barges.

The intake tunnel, which has its top 5 ft. below the water level, is terminated about 50 ft. beyond the water line at the lake shore and a channel was dredged out 15 ft. in depth leading up to this tunnel, which required approximately 7,000 cu.yd. of dredging by dipper dredge. This tunnel is protected at the lake end by a timber ice boom, a submerged sheet pile weir having its top 5 ft. below the surface and a steel bar screen with 6-in. spacing. Inside the plant, the circulating water passes through revolving screens having $\frac{1}{4}$ -in. mesh, into a large suction chamber between the foundations of turbines Nos. 1 and 2. Gate houses are provided at the lake termini of both intake and discharge tunnels, so that stop logs can be placed for shutting off the water at these points.

TUNNELS FOR CIRCULATING WATER

Over 1,100 lineal ft. of tunnel and 150 ft. of construction shaft were required for the circulating water system, together with gate houses and a large screen and intake chamber below the condensers and pumps in the turbine room. This location of the traveling screens was decided upon because it saved excavation, permitted the use of overhead crane for lifting the screens for inspection or repair, and gave better operating supervision than if located at the tunnel mouth. As stated above, these tunnels have 10 ft. inside diameter and have a minimum thickness of concrete lining of 12 in. and an average thickness of 18 in.



SIGNALING AND SYNCHRONIZING PANEL FOR EACH MAIN GENERATOR

At the site of the plant, the general level of the ground averages about 50 ft. above the lake level, with a steep bluff at the lake shore. It was desired to provide a suction chamber at the lake level, and to place the condensers at such a level that the water could be circulated through them with a minimum lift, as otherwise

an enormous amount of energy would be expended in raising the large quantity of water required for condensing purposes. This necessitated placing the condensers at a low level, which, in turn, determined the level for the turbines and boilers. The deepest excavation required was to an elevation 20 ft. below lake level for turbine foundations and intake chamber, placing the main condenser floor at elevation plus 1 and the main boiler room and turbine floor at elevation 32 or about 18 ft. below the ground level.

These requirements, together with the inclined cuts for railroad tracks, necessitated excavating approximately 131,000 cu.yd. of soil from a pit having a maximum depth of 70 ft. below the surface of the ground, resulting in an exceedingly difficult grading job.

The main smoke flues leading from the boilers to the smokestacks are in the form of concrete boxes approx-

imately 8 ft. high and 11 ft. to 18 ft. wide. Two reinforced concrete smokestacks were constructed, having a height above foundations of 220 ft., inside diameter at top 15 ft. and bottom 16 ft. 6 in. These smokestacks were lined with a 4-in. concrete lining for a height of 60 ft. The main shell of the chimney was 5 in. thick at the top and 16 in. thick at the bottom. The concrete foundation for each chimney was 28 ft. square and 5 ft. thick, heavily reinforced. Each of these chimneys was constructed in about sixty-four days.

The construction of the main buildings involved the use of about 2,250 tons of structural steel, a part of this being in the form of steel plate coal bunkers, steel supports for machinery, galleries and stair work. In the pulverizing building, the steel frame was designed for supporting overhead coal bunkers having a capacity of 3,500 tons.

The coal dumping and crushing plant presented peculiar construction difficulties, being located on the slope of the bluff at the lake shore. The coal cars are brought in to the dumper on the high level at elevation 56. The crushing building is surrounded on three sides by high retaining walls, the west wall of the building forming a retaining wall nearly 50 ft. high and the two end walls being braced to the building floors by means of concrete struts, thereby greatly reducing the spans for the concrete and the materials required for the walls.

The quantities of principal parts of the work performed and materials used may be summarized as follows:

Cubic yards of rough excavation	131,892
Cubic yards of finish excavation	18,500
Miles of railroad track laid	5.5
Tons of stone placed in rubble mound	80,294
Cubic yards of concrete	25,000
Tons of reinforcing steel	1,250
Bags of cement	155,000
Feet of lumber	2,326,000
Number of brick	1,445,000
Tons of structural steel	2,237
Lineal feet of 10-ft. tunnel	1,145

MECHANICAL EQUIPMENT OF LAKESIDE POWER PLANT

The main units at Lakeside station consist of two 20,000-kw. turbo-generators, 13,200-volts, three-phase, 60-cycle, operating on 250 lb. steam pressure, 200 deg. F. superheat, with 1 in. absolute back pressure. The auxiliaries for each unit comprise one 35,000-sq.ft. three-pass condenser; one 24-in. 18,000-gal.-per-minute circulating water pump driven by 170-hp. motor; one 24-in. 18,000-gal.-per-minute circulating water pump driven by 170-hp. steam turbine; one condensate pump driven by a 50-hp. motor; one turbo-air pump driven by 100-hp. motor; one steam jet air pump, and one air washer.

Each condenser is thus provided with two half-capacity circulating water pumps of 18,000 gal. per minute each, one being motor driven and the other connected to a steam turbine. Both of these pumps will be required during the summer months when the water is warm, but only one will operate during the winter.

An air washer is installed for each generator which draws its supply of air from the main turbine room, eliminating a separate screen house and an air duct to outside the building. Suitable means of admitting air into the turbine room from the outside during the cold weather has been made in the monitors on the roof while during the milder weather it is admitted through ventilators in windows. The generators discharge the air into the basement of the boiler room through sheet metal ducts, thereby using the heated air to augment the regular supply to the boiler furnaces. Provision was

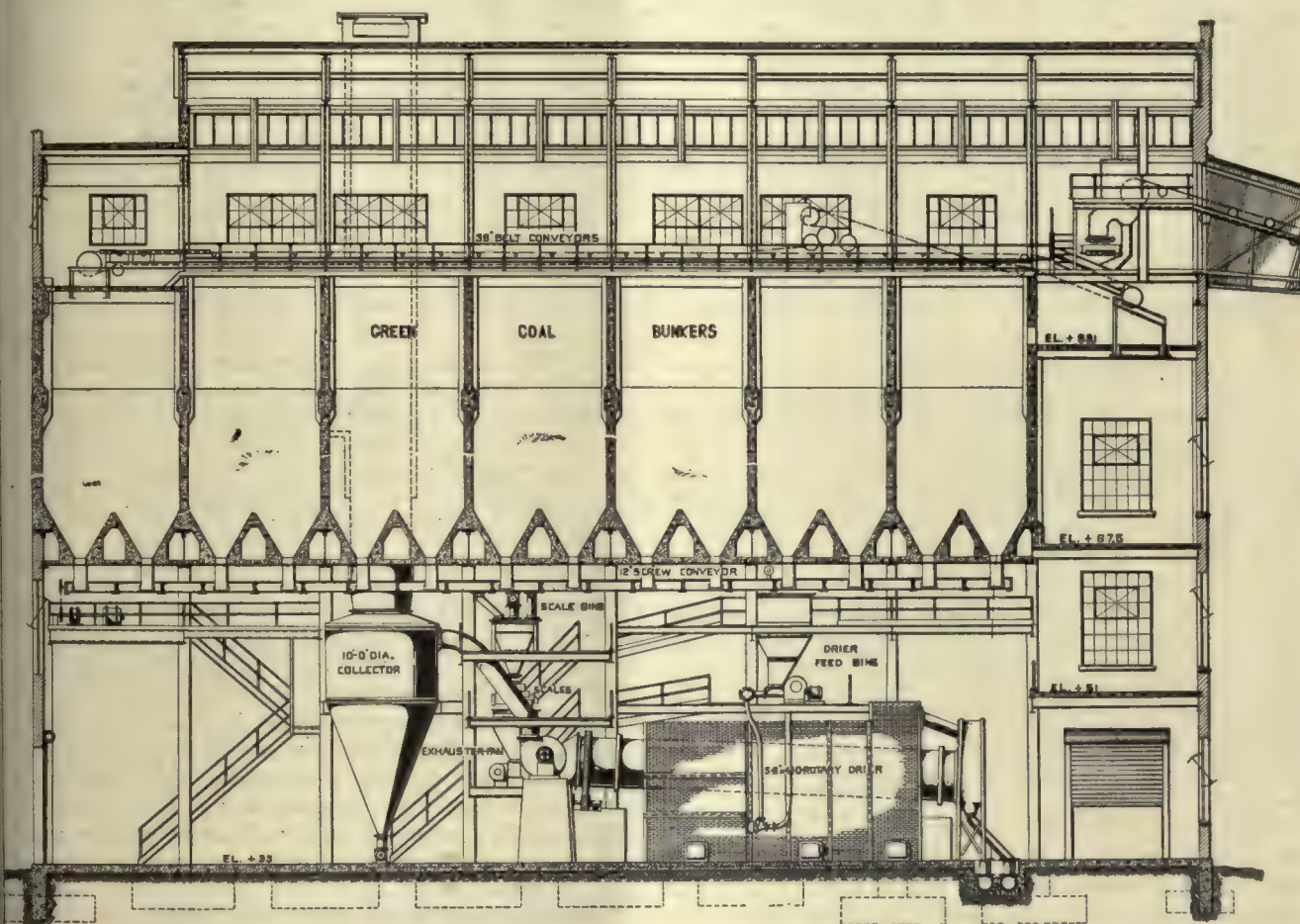
made in these discharge ducts to by-pass a sufficient amount of air back into the turbine room during cold weather so as to temper the air and reduce the openings of the ventilators to a point that will give a proper turbine room temperature. This design of air ducts for generator cooling gives the best results with least investment cost, and also provides for noise reduction.

Automatic dampers have been installed in both the air intake and discharge ducts as close to the generator as possible as a means of fire protection. These close when an unusually high temperature is attained, such as might be occasioned by fire. Arrangement will also be made for admitting carbon tetrachloride, or other fire extinguishing liquid. The station is equipped with the

Each boiler is fitted with a Foster superheater, having a capacity to increase the temperature of 90,100 lb. of steam per hour from 411 deg. F. to 611 deg. F., thus realizing a superheat of 200 deg.

The boiler furnaces are arranged for burning pulverized fuel, which is fed into them by screw feeders from pulverized fuel storage bins overhead. Six out of the eight boilers are equipped with the Lopulco system, that being the design which was tested out in Oneida Street and found satisfactory. Two boilers were fitted with the Fuller system for experimental purposes.

There are installed eight Sturtevant economizers of 7,603 sq.ft. heating surface, one for each boiler, arranged with by-pass connection to the stack for flue



LONGITUDINAL SECTION THROUGH PULVERIZING PLANT

necessary pumps for sanitary service, which pumps are connected as to be available for reserve feed tank service. An air compressor for cleaning generators and other electrical equipment, operating pneumatic tools, boiler tube cleaners and general service also forms part of the station equipment.

INITIAL BOILER ROOM EQUIPMENT

There were installed eight 1,306-hp. Edge Moor boilers, designed for 300 lb. pressure. The boilers are arranged four in each of two rows. They operate normally at 200 per cent of rating. At this rating three boilers are sufficient to furnish steam for one 20,000-kw. turbine, leaving two spare boilers to allow for cleaning and maintenance. This number of boilers will also be necessary in order to furnish steam in the future for the larger generating units which are expected to be installed in the next section built.

gases. Each economizer is equipped with an induced draft fan driven by a steam turbine. The economizer receives the feed water at 140 deg. F. temperature and raises it to 255 deg. F.

The condensate from the condensers on the large turbines is pumped to an overhead hot well tank, the water from which feeds by gravity to two Hoppes heaters, maintaining a fairly constant pressure on the supply pipe thereto. The heaters raise the temperature of the feed water from approximately 80 deg. to 140 deg. F. The overhead hot well tank is equipped with an overflow to a reserve feed water basin located below the basement floor of the boiler room. The water is reclaimed from this basin by means of centrifugal pumps and is delivered to the overhead hot well tank as needed. From the heaters the feed water passes by gravity through an 800,000 lb. per hour "V" notch feed water meter of extra storage capacity. This meter is located

on the floor above the feed pumps and gives a 15 ft. suction head on the pumps.

There is also installed a common test line with connections from condensate pumps on each condenser which discharges into a test meter of the "V" notch type of 300,000 lb. per hour capacity, from which it flows by gravity into the heaters. The test meter is located on the floor level with the overhead hot well tank.

The feed water pumps installed consist of two 6-in. centrifugal 650-gal.-per-minute feed pumps driven by 250-hp. steam turbines and two 4-in. centrifugal 400-gal.-per-minute feed pumps driven by 150-hp. motors. The maximum quantity of feed water required for eight boilers operating at 200 per cent rating is 1,254 gal. per minute. This leaves two motor-driven pumps or one steam-driven pump as spare. These pumps are located on the boiler operating floor level at the west end of the boiler room.

As the quantity of ash from pulverized fuel furnaces is very small and very fine it is easily conveyed by means of steam jet ash conveyors. A system of steam jet conveyors is installed with main runs leading to furnace ash pits and branches leading to combustion chambers at the rear of boilers and soot pits under the economizers. This conveyor discharges into an ash bunker which spouts into cars on the railroad track at the east end of boiler room.

PLANT FOR PREPARING COAL

The coal bunker is located in the pulverizing plant and has a storage capacity of 3,400 tons, which is slightly more than three and one-half days supply for maximum operation of all boilers in this section. The coal is taken from this bunker by means of three screw conveyors, which convey it to automatic weighing scales. From the scales it is taken by another set of screw conveyors and fed into the dryers. With this arrangement it is possible to take coal from any point in the bunker and deliver it to any one of three dryers. It also allows the coal to be weighed just before reaching the dryers, which is much to be preferred over the method of measuring coal as it enters the coal bunkers inasmuch as it permits of a close daily check on coal consumed in the plant.

Three dryers capable of reducing the moisture content in the coal from 10 per cent to 1 per cent have a capacity of 17½ tons per hour each. From the dryers the coal is discharged into screw conveyors, which convey it to bucket elevators, which in turn deliver it to other screw conveyors to be transferred to dried coal bins over the pulverizing mills.

Eight mills each having a capacity of six tons per hour pulverize the coal so that 85 per cent will pass through a 200-mesh screen and 95 per cent through a 100-mesh screen. The mills are each direct connected to a 100-hp. motor. Each mill is also provided with a fan for separating the pulverized particles which have been reduced to the necessary fineness, discharging them into cyclone separators overhead, where the fuel is separated from the air and falls by gravity into a screw conveyor located at the base of the separators. This conveys it to the pulverized fuel bins. From these bins it is conveyed to fuel bins in the boiler room by means of the Fuller-Kinyon system of transporting pulverized material.

Coal is removed from cars by means of a rotary car dumper of the Robins-Scherzer type and dropped into a track hopper fitted with bottom shaker feeders. Belt

conveyors carry the coal from the track hopper over a magnetic pulley for the removal of such iron as may be in the coal. It is then passed through a two-roll crusher and hammer mill, where it is reduced to ½ in. size. It next discharges directly onto an inclined belt, which carries it to the distributing belts over the coal bunker in the pulverizing plant. There are three such distributing belts over the bunker, each having a traveling tripper which discharges coal at any point along the length of the belt.

The crusher and hammer mill have a capacity of 150 tons of mine run coal per hour. The conveyors are 36-in. belts, having a capacity of 250 tons per hour at 250 ft. per minute. Provisions have been made for the installation of another crusher unit which will double the capacity when required in the future. Provision has also been made for the future storing of rail coal on the dock by means of by-passing the crusher and conveying the coal by belt to the dock, where it will be taken up by coal bridge and stored. Coal from the dock will be reclaimed by reversing the operation and delivering coal reclaimed into crushers. Lake coal will be taken into the plant in the same way.

METHOD OF MAINTAINING HEAT BALANCE

It was decided in order to obtain a well-balanced heat condition for use in connection with heating feed water to a suitable and regular temperature before introducing it to the economizer to install steam drive for boiler feed pumps, induced draft fans and half of circulating pump capacity, leaving the balance of steam required for heating feed water to be supplied in varying quantities by the house unit, or so-called heat balancer. All other auxiliaries are direct motor driven.

ELECTRICAL FEATURES OF NEW POWER PLANT

Current at the Lakeside plant is generated at 13,200 volts and all outgoing high-tension lines operate at 13,200 volts and leave the station underground. Many of the lines have been connected to the Commerce Street power plant and other stations in Milwaukee, but others will be connected to an outdoor transformer station near at hand, which will step the pressure up to 26,400 volts for transmission to distances in general exceeding 6 miles. It is possible that at a later date some energy will be stepped up to 66,000 volts or more for transmission to remote points.

The generators in the initial installation are General Electric Company, 20,000-kw., 0.8-power factor, three-phase, 13,200-volt, 60-cycle, 1,800-r.p.m. machines. Excitation for the generators is furnished at 240 volts and is normally supplied for each generator by its own direct-connected exciter. Emergency excitation is furnished from the d.c. station power service. The oil switch control system is 120 volts d.c., regularly supplied from a separate storage battery and special motor-generator sets. If necessary the oil switch control may be transferred immediately to the battery on the d.c. station power system by connecting it across one-half of the cells.

The 13,200-volt main connections and circuit breakers are located exclusively in the switch house. There are two main bus bars with sectionalizing switches between generator sections. Possible future sectionalizing reactors will be installed. To promote safety and prevent electrical trouble from spreading, all 13,200-volt bare copper and cables are taped with approximately ½ in. of varnished cambric and covered with a layer of

cotton tape impregnated with a fire-resisting substance. Each generator may be connected to either main bus through selector oil circuit breakers. Feeders are connected in groups of three to feeder group bus bars, which in turn may be connected to the main bus bars through group circuit breakers.

The arrangement of equipment in the switch provides for reliability of operation. Some of the features of the arrangement of apparatus are these: The main circuit breakers of different generators are separated a considerable distance from one another with from three to

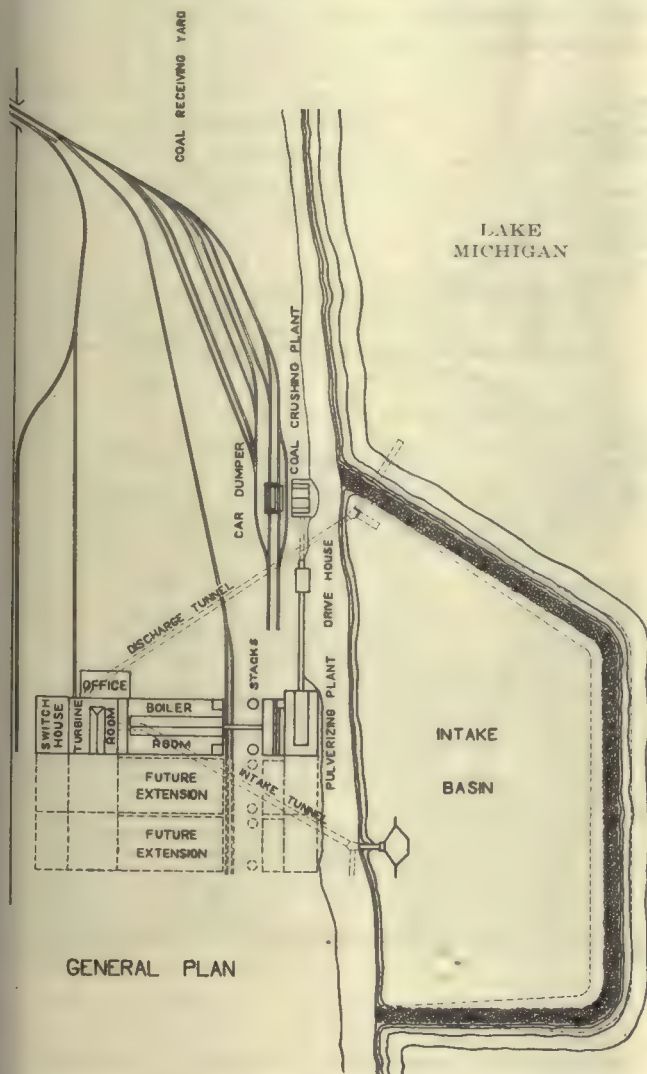
a nearly horizontal direction from the generator foundation through a tunnel underneath the switch house and then rise vertically to the generator selector bus on the second floor. The generator leads each consist of two 1,000,000 circ.mil, single-conductor, stranded copper cables insulated with $\frac{1}{8}$ -in. cambric and covered with a flame-proof braid. Although these cables are in a dry place and insulated for the operating voltage they are nevertheless supported clear of everything on porcelain bus bar supports spaced approximately 3 ft. apart. Cables are continuous without joints from the generator to the current transformer on the first floor. From the current transformers to the main circuit breakers the leads consist of two $\frac{1}{2}$ -in. x 3-in. copper bars. The main generator oil circuit breakers are General Electric type H-6, rated at 2,000 amp., 15,000 volts and capable of rupturing 18,000 amp. at the rated voltage. Each pole of these breakers is located in an entirely separate compartment and the crossheads are in another separate compartment underneath the operating mechanism on the fourth floor. The main bus bars on either side of the room consist of two or more $\frac{1}{2}$ -in. x 4-in. copper bars suspended from the ceiling on substantial porcelain insulators and separated from one another by gypsum barriers 2 in. thick. The main bus bars are on opposite sides of the room, making it practically impossible for trouble on one set of bus bars to involve the other.

The feeder group bus is connected between the group oil circuit breakers, one of which is directly over the west main bus and the other over the east main bus. Feeders are tapped off between the group circuit breakers. Conductors run from the feeder bus through porcelain bushings in the wall, thence upward to the feeder oil circuit breaker and down through current transformers and feeder reactors to disconnecting switches and cable terminals. Group oil circuit breakers are of the same type as the main generator bus bar, but rated 800 amp. and having a rupturing capacity of 18,000 amp. The crossheads, as in the case of the generator breakers, are located in a separate compartment underneath the operating mechanism on the fourth floor. Feeder breakers are General Electric type H-3, rated 300 and 500 amp., depending upon the size of feeders connected, and will rupture 10,000 amp. at 15,000 volts.

STATION SERVICE POWER

On account of the fact that some of the motor-driven plant equipment, such as that for coal crushing and pulverizing, is located a considerable distance from the source of supply, it was decided that such auxiliaries should operate at 480 volts. It was further decided that some d.c. auxiliary service should be furnished on account of the turbine room crane, motor-operated steam valves, car dumper, magnetic pulley and certain operations requiring variable speed. To make this service available as an emergency source of excitation, 240 volts was selected. To simplify the station power service, the control of main emergency auxiliary feeders was placed under the control of the switch house operator, who handles this system exactly as a substation supplying a group of customers. For the purpose of adding to the safety of workmen, safety switches have been adopted for use at the various motors. All bare copper bus bars, cable and wire are insulated adequately to safeguard the service.

Service for a.c. auxiliaries is furnished by two 3,000-kva., 13,800-13,200-volt primary, 480-volt secondary, 60-



GENERAL LAYOUT OF LAKESIDE POWER STATION FACILITIES

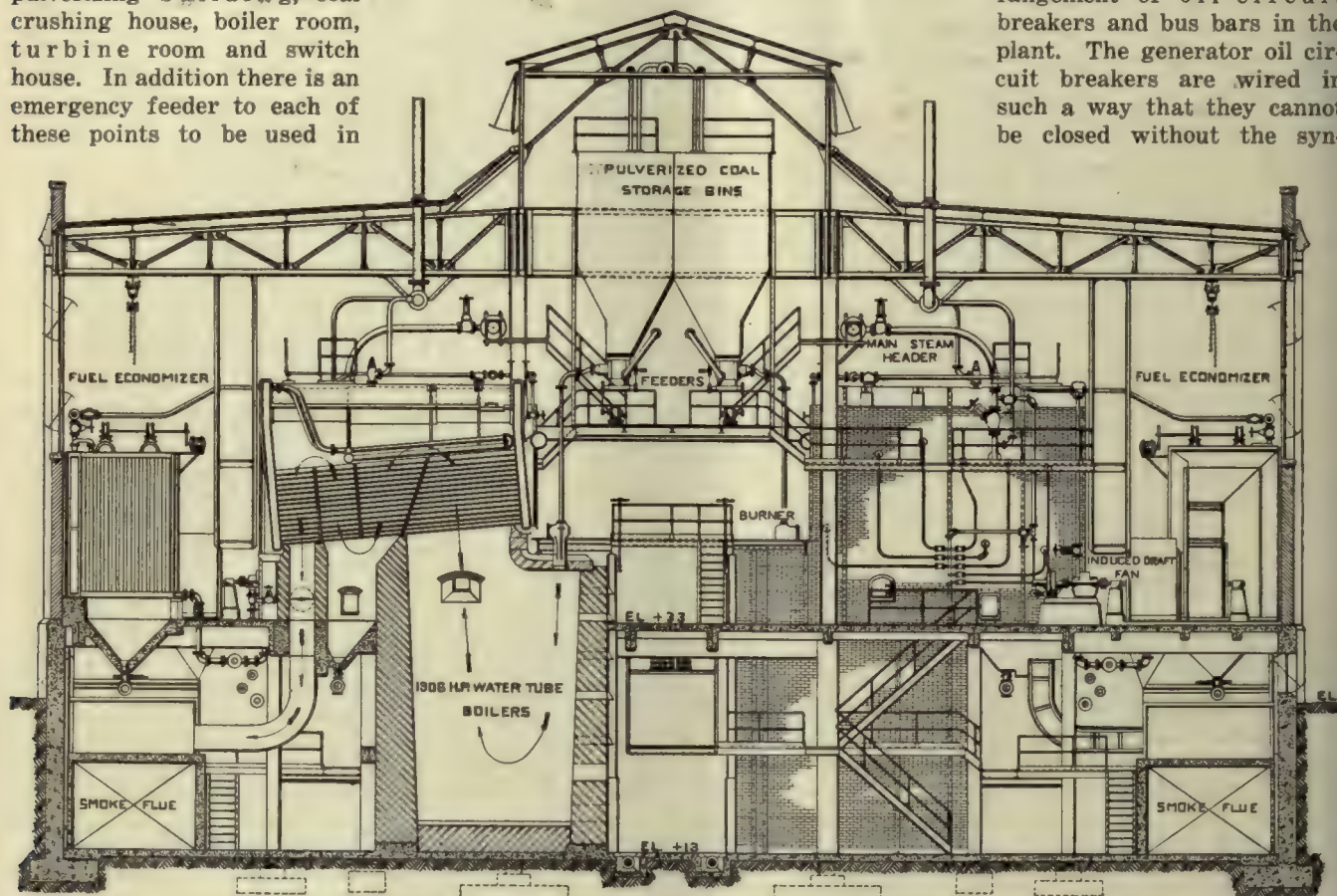
four groups of feeder breakers between them. Because of this it will be difficult for trouble on one set of generator breakers to be communicated to the breakers of other generators. The group breakers of any one feeder group are located as far as possible from one another, one being at one end and the other at the opposite end of the feeder section. This makes it unlikely that trouble in one group breaker will involve the other group breaker on the same feeder group.

Oil circuit breaker mechanisms are located on the fourth floor, oil circuit breakers on the third floor, main bus bars, potential transformers, feeder current transformers, feeder reactors and feeder group bus bars on the second floor, and generator current transformers, lightning arresters, feeder potheads and disconnecting switches on the first floor. The generator leads pass in

cycle, three-phase, water-cooled transformers, one serving as a reserve for the other. These transformers are located in the turbine room basement underneath the mezzanine floor on which the generator field and exciter rheostats, neutral oil circuit breakers and other electrical auxiliaries are located. Located as they are, the 13,200-volt cables supplying them are short and do not pass through any part of the plant where they may be subjected to too much heat and consequent liability of trouble. Bus bars, transformer circuit breakers and oil circuit breakers on feeders to distribution points throughout the plant are all in duplicate. There is one main feeder to each main division of the plant, such as pulverizing building, coal crushing house, boiler room, turbine room and switch house. In addition there is an emergency feeder to each of these points to be used in

squirrel cage induction motor, direct connected to a 250-volt d.c., 1,200-r.p.m. shunt wound generator. These sets are supplied from the 480-volt a.c. station power system. To guard against a shut down, a 150-cell G-15 battery in G-23 tanks is kept floating across the 240-volt bus. The main d.c. busbars and switches are located on a switchboard in the operating room. Each main feeder is provided with an ITE circuit breaker and at the various distribution panels and cabinets in the plant fuses are provided on branch circuits.

The main station wiring is represented by mimic busbars on the bench sections and the arrangement of control switches is such as to conform exactly with the arrangement of oil circuit breakers and bus bars in the plant. The generator oil circuit breakers are wired in such a way that they cannot be closed without the syn-



CROSS-SECTIONAL VIEW OF THE BOILER PLANT

case of trouble on the main feeders. The auxiliary bus bars consist of $\frac{1}{4}$ -in. x 4-in. copper bars supported on substantial porcelain insulators in horizontal compartments above the oil circuit breakers on the auxiliary feeders. Large air brake circuit breakers are used instead of oil circuit breakers on the secondary side of the auxiliary transformers. These breakers are provided with reverse power relays so that with both transformers in operation trouble in a transformer or on its primary breaker will cause the proper breakers to open, thereby clearing the trouble without interfering with the service. Station distribution switchboards, located in various parts of the plant, are constructed in such a manner as to make it possible to kill half of them for work to be done without interfering with service on the other half.

The general arrangement of the d.c. auxiliary supply is similar to that of the a.c. This system is supplied by two 300-kw. motor-generator sets, one serving as reserve for the other and each consisting of a 480-volt, 60-cycle,

chronizing plug being in its receptacle. The same is true of feeder oil circuit breakers. The signaling equipment on the bench board is exactly the same as that on the instrument panel at the turbine throttle. Since the switchboard operator is in an entirely different room from the steam engineer, it is necessary for them to make use of signals in bringing machines up to speed and cutting them in or out.

There are three feeders per panel, each panel corresponding to a feeder group. The equipment per feeder on each panel consists of three ammeters, one voltage indicating lamp, one synchronizing receptacle, one pull button control switch with red and green indicating lamps and three overload induction relays with test links.

To make it possible to communicate with all parts of the plant at any time of the day or night with the minimum of operating expense, an automatic telephone system has been installed. The exchange controls twenty-five circuits with an ultimate capacity for 50.

Letters to the Editors

The Trolley Shoe or "Slide" at Low Speed

LEAGUE CITY, TEX., April 8, 1922.

To the Editors:

I have read considerable discussion on the merits of the sliding contact shoe as against the standard trolley wheel, but there is one feature of the case as I have experienced it that has never been touched upon in anything I have read or heard. This is the unusually great wear on the trolley wire by the sliding shoe at low speeds. And while this might not be a deciding factor on high speed roads it would have a bearing in selecting a current collector for city cars, which of necessity must run slowly in the downtown sections, or for interurbans, which use city lines for entering the city.

My experience has been exclusively on high-speed interurban trolley,* and about three years experience proves conclusively that the wear on the trolley wire is very much greater at slow speed with the slide than with the wheel. And it would seem that the extra wear is due almost entirely to increased friction at slow speed. This is proved by tests which I have made.

For a period of about seven years we used wheels, and micrometer measurements of the trolley wire wear at intervals revealed no noticeable difference in the wear at points of high and slow speed, but after adopting the contact slide this became very noticeable without measurements. This extra wear was so great that in less than three years it was necessary to renew the wire at points where frequent stops were made, as in front of stations. And the first places to be renewed were those of most frequent stops. It has been suggested that the increased wear might be due to increased current draft in starting, but this is disproved by the fact that increased current draft with the wheels showed no difference in wear.

Another proof that it is increased friction is the fact that at high-speed points the wire takes on a gloss on the underside when the slide is used while the gloss is entirely absent where the speed is slow, indicating that the wire is being cut away with every passing trolley. The distance of increased wear is not very great, however, it being necessary to renew but little more than 10 ft. of trolley wire at each place renewed. This is due to the rapid acceleration of the trains in starting. I have also noticed that the slide is more destructive of trolley wire fittings—as splicing sleeves, section insulators, frogs and crossovers—than the wheel. This is due to the fact that a smooth under-run is never secured on these devices, and a hammer blow results with the passing of every slide, which forms a "shoulder" which is aggravated with each blow struck. The wheel rolls on this uneven place with the result that the wear is not so great. This hammer blow tends also toward crystallization of the wire, making breaks at the entrance of the wire more liable. The tendency to run the slides after they are badly worn also is destructive to fittings, more so than the wheel, due to the fact that the slide takes on a more restricted groove than the wheel. After passing the end of a fitting the shoe has an upward thrust, and the resulting blow may tend to crystallize the wire.

The Galveston-Houston (Texas) Electric Railway.

This is not to be construed as being written in condemnation of the sliding contact, but only to point out certain results which may be expected from its use, results which I have never heard mentioned in discussions. My experience is that the slide stays on the wire better than the wheel, has much less arcing and pitting of the wire, and except in the faults mentioned is superior to the wheel. But in using it, it is well to pay special attention to fittings and points of slow speed, putting secure anchorage for the trolley wire on each side of such places, to catch breaks which may occur.

C. L. GREER.

What the Committee on Welded Rail Joints Is Doing

BROOKLYN RAPID TRANSIT COMPANY

BROOKLYN, N. Y., April 11, 1922.

To the Editors:

The committee on welded rail joints has been making considerable progress in its preliminary work and it seems advisable to make a statement concerning its organization and the nature of the work so far accomplished. While the work, from its very nature, must be somewhat slow it will be realized by those who have tried to answer the questions in the four sets of data sheets recently sent out that the task of preparing them was no small one. It is quite certain that from this time forward the work will proceed faster because the committee is now in possession of enough preliminary data to permit the assignment of the various subjects requiring special research to definite sub-committees. It is now expected that a meeting of the general committee will be called early in May.

The American Electric Railway Engineering Association, through its 1921 committee on way matters, initiated the formation of a special committee on welded rail joints for the purpose of having an authoritative investigation made of the various types of welded rail joints now in commercial use. The American Bureau of Welding, as the co-ordinating agency in the general field of welding research and standardization, undertook to organize the committee.

Welding in one form or another is being widely used in making joints in street railway rails, but more or less trouble has been experienced in all types of welded joints from breakage. Very few scientific data exist as to the correct procedure to be followed in making the welds by the several processes. Several of the larger electric railway companies are spending many thousands of dollars yearly on such joints. Much of this expense is being made without a sufficient knowledge of the underlying principles involved.

A preliminary organization meeting of the committee on welded rail joints was held in June, 1921, at the office of the American Welding Bureau in New York City. At that meeting a plan of organization was prepared and the method of conducting the work outlined. A relatively large committee has since been organized, including representatives of users, consumers and the best technical experts in the field. For the purpose of directing the work during the formulative period the following were asked by the Welding Bureau to serve as an executive committee: Dr. G. K. Burgess, United States Bureau of Standards, chairman; E. M. T. Ryder, way engineer Third Avenue Railway, vice-chairman; C. A. Adams, director American Bureau of Welding;

H. M. Steward, superintendent of maintenance Boston Elevated Railway, and the writer.

It should also be noted that the Engineering Association has become a member of the American Bureau of Welding, with E. M. T. Ryder as its official representative, in order to further the important work which the bureau is conducting in its direction of the work of the welded rail joint committee.

The members of the general committee are:

- F. E. Abbott, consulting inspection engineer Lackawanna Steel Company.
- C. A. Adams, Harvard University, director American Bureau of Welding.
- E. O. Ackerman, engineer of way Columbus Railway, Power & Light Company.
- G. K. Burgess, Bureau of Standards, Washington, D. C.
- Alexander Churchward, consulting engineer Wilson Welder & Metals Company.
- R. C. Cram, engineer surface roadway Brooklyn Rapid Transit Company.
- J. H. Deppeler, chief engineer Metal & Thermit Corporation.
- H. M. Gould, City of Detroit Department of Street Railways.
- H. F. A. Kleinschmidt, superintendent track welding department Lorain Steel Company.
- C. F. Lederer, Metal & Thermit Corporation.
- J. C. Lincoln, president Lincoln Electric Company.
- E. J. McIlraith, superintendent of way Philadelphia Rapid Transit Company.
- J. K. Punderford, vice-president and general manager the Connecticut Company.
- E. M. T. Ryder, way engineer Third Avenue Railway System.
- William Spraragen, engineering division National Research Council.
- W. C. Starkey, chief engineer Ohio Brass Company.
- G. Wallace Smith, engineer San Antonio Public Service Company.
- H. M. Steward, superintendent of maintenance Boston Elevated Railway.
- H. L. Whittemore, Bureau of Standards, Washington, D. C.
- G. L. Wilson, engineer maintenance of way Minneapolis Street Railway.
- W. W. Wysor, chief engineer United Railways & Electric Company of Baltimore.
- F. A. Weymouth, sales metallurgist Bethlehem Steel Company.
- G. C. Estill, superintendent way and structures New Orleans Railway & Light Company.
- E. Vom Steeg, General Electric Company, New York.
- R. H. Dalgleish, chief engineer Capital Traction Company.
- H. H. George, engineer maintenance of way Public Service Railway.
- John H. Hanna, vice-president Capital Traction Company, Washington, D. C.
- C. S. Kimball, engineer way and structures Washington Railway & Electric Company.
- E. C. Price, the Indianapolis Switch & Frog Company.
- Jonathan Wolfe, assistant superintendent track and roadway Chicago Surface Lines.
- H. A. Currie, the New York Central Railroad.
- D. D. Ewing, Purdue University.
- A. P. Way, American Railways Company.

The general scheme of conducting the work, subject to such changes as may be made at the meeting of the committee, is as follows:

1. Preparation of a bibliography and critical summary of our present knowledge, including the gathering together of all available experience in this field.
2. Consideration of the results of (1) and the laying out of specific experiments to be performed.
3. The assigning of each of these experiments or researches to an appropriate laboratory, or in the case of field experiments to one or more appropriate operating companies. These assignments would, of course, cover the men under whom these specific experiments will be conducted.

So far the work of the committee has been financed principally by the American Bureau of Welding. The

committee is without funds and it is hoped that various railway companies, together with the several manufacturing interests, will contribute toward the expense of the work, either by furnishing test specimens for conducting field tests, laboratory experiments and tests or with direct cash contributions.

R. C. CRAM,
Engineer Surface Roadway.

Motormen Need Knowledge as Well as Good Physique

PORTLAND, ORE., April 8, 1922.

To the Editors:

I read with interest the letter from the Georgia Railway & Power Company, in the April 1 issue of the *ELECTRIC RAILWAY JOURNAL*, concerning the selection of employees. From the viewpoint of a motorman I heartily agree with the points raised in that letter. If a man has some physical defect he is a dangerous man around any kind of railway.

But there's something else just as important as physical fitness—that is, knowledge. Knowledge as applied to the motorman comprises three things: common sense, judgment and training. Over the first two the employing company has very little control, but over the last has, and here is where a good many fall down.

Take, for example, two interurban electric roads operating heavy trains. On the first the motormen are required to take rigid air-brake and technical examinations and the discipline is very strict as to operating rules. On the other no examination on air-brakes or other equipment is required and discipline on operating rules is very slack.

Now which of these roads will come out better in the end? I believe the first one, and it is my contention that no electric road, particularly an interurban can afford to get along without the air-brake examination.

GEORGE W. BOOTH,
Interurban Motorman.

Is Salesmanship in Transportation Possible?

THERE are not a few railway managers who say that salesmanship on the other fellow's property may be all right and possible, but how can it apply to their properties? Salesmanship such as evidenced in the following appears to be possible anyway:

"A traveling business man reports as follows: . . . , a couple of weeks ago, I was very agreeably impressed by a conductor, who, when I thanked him for information, replied with a smile, 'You're welcome'."

"In . . . (another town) too, they seem to have conductors who take an interest in passengers. On a conductor who carried me past my destination, stopped the car, came to me and said, 'I owe you a fare. I have carried you five blocks past your stop.' He then gave me a ticket (good for 8 cents) and told me where to stand to get the return car."

"The conductor on the returning car was a salesman also. I told him where I wanted to get off, describing the location as near a certain factory I desired to reach and he not only told me where the corner was, but, as he was alighting, told me which way to walk to reach the factory I was looking for."

"I was impressed with the fact that while these were homely acts yet they were acts which evidenced a real instinct toward salesmanship."

Equipment and Its Maintenance

*Short Descriptions and Details of New Apparatus of Interest
to the Industry. Mechanical and Electrical
Practices of All Departments*

New Double-Truck One-Man Cars in Bangor

Light-Weight Cars Embodying All Safety Car Features
Have Been Placed in Service by the Bangor
Railway & Electric Company

BY HORACE B. BALDWIN

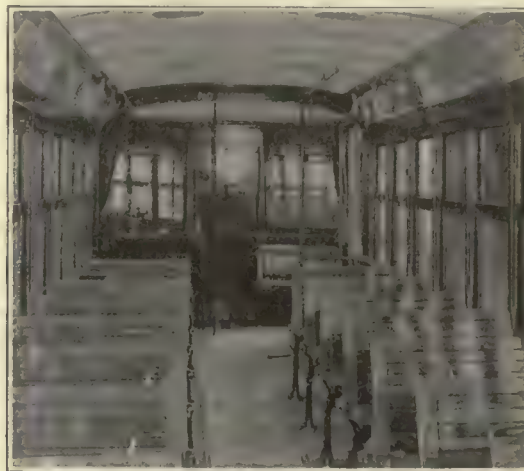
Master Mechanic Bangor Railway & Electric Company,
Bangor, Me.

THE Bangor Railway & Electric Company has operated fifteen Birney safety cars equipped with General Electric type-258 motors since October, 1918. This operation has been very successful, but now as it is necessary to purchase new rolling stock the officials have decided to develop a light-weight double-truck car for one or two-man operation. This car can be used on either city or suburban lines, will weigh about 28,000

Other details include A.E.R.E.A.—E 2 standard axles, 4 General Electric 258 Form C motors, K 35 HH control, General Electric CP 27 B air compressor, Safety Car Devices Company full safety equipment provided with whistles, Root air-operated snow scrapers, operators 14-in. foot gong, Keystone trolley catchers and Cleveland fare boxes. Two sliding curtains are provided which inclose the end of the car around the operator. Simplex No. 3 trolley bases, Golden Glow type S M 95 headlights and 22 Consolidated Car Heating Company's type 392 cross seat heaters are also used.

SOME DETAILS OF CONSTRUCTION

The body is framed for thirteen windows on each side. The side posts are $1\frac{1}{2}$ in. x $\frac{1}{4}$ in. tees which run in one continuous length from side sill to side sill, and thus form the carlines. The post spacing is $28\frac{1}{2}$ in.



EXTERIOR OF NEW LIGHTWEIGHT CAR, AND AT RIGHT VIEW SHOWING INTERIOR AND PLATFORM ARRANGEMENT

seat fifty-two passengers and be equipped with four motors of the same type as used under the safety cars. The same general construction and all parts above the underframing will be standard with the Birney cars.

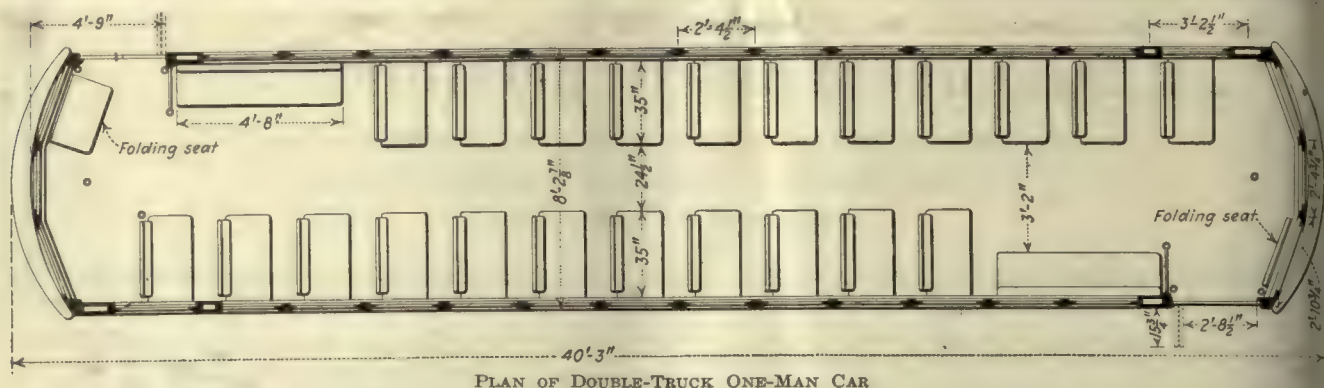
Six of these cars have been built by the Wason Manufacturing Company. The first two cars were put into service on Feb. 10, 1922, on the Bangor and Hampden line and will replace cars weighing 46,000 lb. of the semi-convertible type seating forty-four passengers, and equipped with four 40-hp. motors. During the snowstorm of Feb. 16, 1922, these cars operated very satisfactorily and we had no trouble in making the running time. The company now feels that this type of car will prove as efficient in snow as the heavier type car which it displaced. Some general dimensions of the cars are given in the accompanying table.

These cars have the general appearance of an elongated Birney safety car. The trucks are the Brill 77 E, specially designed for low floor, with 26-in. wheels.

center to center except that of the extreme window opposite the door opening, which has a spacing of $38\frac{1}{2}$ in. The side sills are 3 in. x 3 in. x $\frac{3}{4}$ in. angles in one continuous piece from end sill to end sill. The cross sills are 4-in. $5\frac{1}{2}$ lb. channel, and the bolsters are of the truss type with plates of 8-in. x $\frac{3}{4}$ -in. and 8-in. x $\frac{1}{2}$ -in. soft steel. Corner posts are pressed steel. The

GENERAL DIMENSIONS AND WEIGHTS OF CAR

Length over bumpers	40 ft. 3 in.
Length of platform	1 ft. 9 in.
Distance between bolster centers	20 ft. 1 in.
Wheel base of truck	5 ft. 3 in.
Width over side sheets	8 ft. 0 in.
Width over all	8 ft. 3 in.
Height, from track to top of roof	10 ft. 1 in.
Height from track to sill	2 ft. 2 in.
Height from track to top of floor	2 ft. 8 in.
Height from track to step	16 in.
Height from step to platform	15 in.
Width over side sheets	8 ft. 0 in.
Width over all	8 ft. 2 in.
Width of door opening	2 ft. 8 in.
Width of aisle	2 ft. 0 in.
Side post spacing	2 ft. 4 in.
Weight of car body with air brake and control equipment	15,110 lb.
Weight of trucks	9,100 lb.
Weight of four G. E.-258 Form C Motors	4,450 lb.



side sheets are $\frac{3}{8}$ in. thick patent level rolled steel in four sections, the belt rail is $2\frac{1}{2}$ -in. x $\frac{3}{8}$ -in. steel and the letterboard No. 18 steel.

Vestibule top plates, hood rim, hood carlines, posts and ribs are of white ash. Dashers of No. 14 sheet steel in three pieces are used and platform floors are $\frac{1}{2}$ -in. hard maple. The bumper is a 3-in. 6-lb. channel.

The roof is of the plain arch type having $\frac{1}{2}$ -in. grooved poplar planking laid lengthwise, and covered with No. 8 cotton duck laid in white lead. The car floor is double laid with the bottom half of $\frac{3}{8}$ -in. clear spruce and the top half $\frac{3}{4}$ -in. hard maple. The aisle flooring is covered with $\frac{1}{2}$ -in. corrugated rubber matting 18 in. wide, which extends to the middle of the vestibule floor. The steps are the folding type 34-in. x $10\frac{1}{2}$ -in. x $1\frac{1}{2}$ -in. maple fitted with a 3-in. special safety treads.

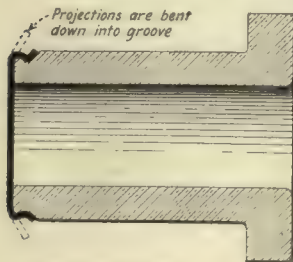
Cherry has been used for the interior finish including the moldings. No headlining was used and the carlines and roof boards are white enameled. The interior of the car body below the belt rail is lined with $\frac{1}{2}$ -in. Agasote painted to match the cherry finish.

There are 22 Brill "Waylo" type reversible cross seats having cherry slats, pressed-steel ends and pedestals. The longitudinal seat at the opposite ends of the car are also of cherry.

The body panels and letterboard are painted Pullman green, the posts cream color and the sash mahogany. There are ten 23-watt lamps on each side of the car, two over each door and two in the illuminated signs, with 46-watt lamps in the headlights. The lower side windows are fitted with storm sashes for winter service and with window guards during the summer.

An Inexpensive Armature Bearing Cap

THE New York State Railways, Rochester lines, is using a cap made of tin as a substitute for the counterbored cap sometimes used as a waterproof and dustproof covering for the outside ends of armature bearings. Trouble was experienced with the usual type of cap falling off and becoming loose when used on bearings that were worn, so that proper attachment could not be secured. The tin cap which is now used is stamped out and given a slight angular turn at the



TIN DUST GUARD FOR ARMATURE BEARINGS

edges. In order to fasten the tin cap to the bearing a tapered slot is cut in the outside near the end. The tin is then crimped into the slot so as to give a secure fastening. This is done by a tool at the same time that

the bearing is turned to fit the armature shaft. When the bearings require rebabbiting again the tin cap is thrown away and a new one used.

A method quite similar to this is used by the Kansas City (Mo.) Railway and was described in the *ELECTRIC RAILWAY JOURNAL* for July 29, 1916, page 197. Another method using a thin sheet steel disk which fits into the end of the armature bearing is used by the Elmira Water, Light & Railroad Company and was described in the July 7, 1917, issue, page 23.

Positive Switch Combined with Signal Provides Desired Protection

AT A POINT where the track leads off the main line of the Pennsylvania-Ohio Electric Company, to serve the Haselton car shops at Youngstown, Ohio, a simple spring switch, normally set for main-line traffic was formerly used. There are frequent car movements

out of the shop yards onto the main line and much trouble was had with split switches because the men were not careful to get the following trucks out clear of the switch before starting back on the main line. To overcome this possibility of trouble, a Bethlehem safety switch stand which locks in both positions was installed. This is a switch stand which always revolves in one direction and which snaps and locks into the new position as soon as a car forces the switch point over slightly,



SAFETY SWITCH STAND AT SHOP YARD TURNOUT EQUIPPED WITH MAIN LINE ELECTRIC SIGNAL INTERLOCK

or as soon as pressure is applied to the switch stand handle. This has completely overcome the splitting of the switch, for there is no dependence placed on the spring to bring the switch to main-line position and the switch point is locked positively in either one position or the other. This makes it necessary for a crew bringing a car out on the main line to throw the switch by hand before starting back on the main line yet permitting movement through the switch onto the

main line without having to set it for the branch-off advance of the car.

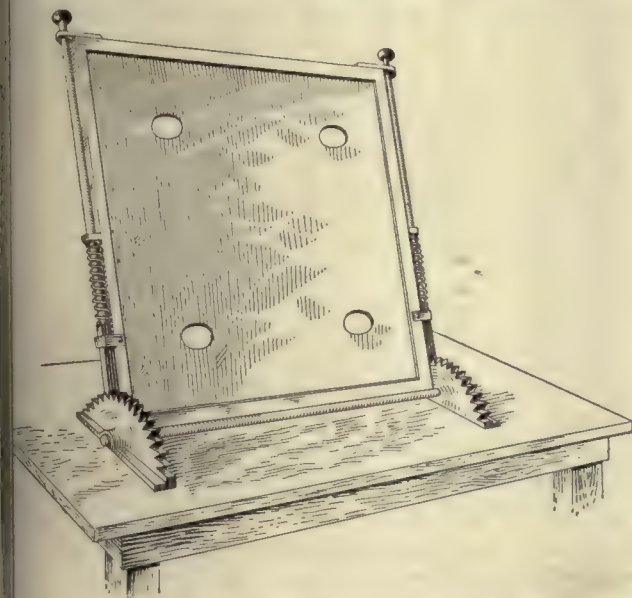
The installation of this type of switch necessitated some protection for the main line, for it will readily be seen that the switch point might be left in the wrong position for main-line traffic. This signal protection was ingeniously provided by A. B. Creelman, master mechanic. An ordinary control finger was mounted on the switch and connected between the switch stand and switch point and arranged to make connection with either one of two contacts. When the switch point is in the shop track position, the connection lights a red signal, and when it is in the main line position, the connection gives the green light signal for main-line traffic. This simple contact mechanism was housed in a steel box located just in front of the switch stand, providing ample protection from the elements.

Practical Kinks from Hampton

Some of the Devices Which Have Proved of Great Assistance in Maintenance Work Include a Hydraulic Portable Pinion Puller, Tank for Cleaning Various Parts and a Rig for Testing Circuit Breakers

THE repair shops of the Newport News & Hampton Railway, Gas & Electric Company are in Hampton, Va., adjoining the main offices and carhouse of the company and are in attractive surroundings. There is plenty of room to expand and the shops have light on all sides. Perhaps it is because of these attractive surroundings that much original work in the way of improved methods of doing things has been developed at the Hampton shops.

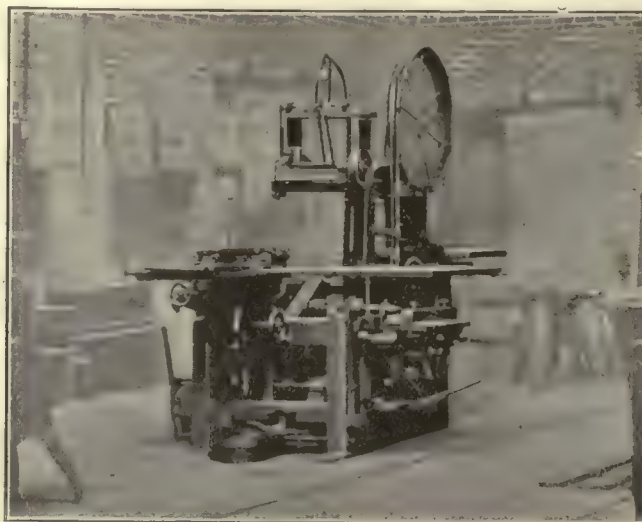
A recent visit to the shops by a representative of this paper disclosed a portable pinion puller, operated by the hydraulic process. The increase of power in this



FRAME ON WHICH CIRCUIT BREAKERS ARE TESTED. IT CAN BE SET AT ANY ANGLE

device is such that a force of 50 lb. on the handle of the puller will develop 40,000 lb. on the ram. A section and a photographic view are given.

In the operation of this puller oil or other liquid is pumped from the reservoir shown at the right in the section through the small duct and valve into the ram chamber, which is set to push against the end of the armature shaft. An extension of the frame of the ram

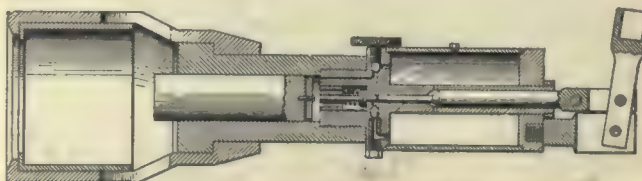


CORNER OF WOODWORKING MILL—VARIETY MACHINE AT LEFT

carries two collars with clamps to join them together, the outer collar having jaws to fit around the pinion to be removed. When the pressure is to be released, the liquid is allowed to flow back into the reservoir by the turn of a setscrew. The puller is the invention of C. W. Wood and E. C. Kelly, both connected with the railway company. It has been patented and has been placed on the market by the Electric Service Supplies Company. It has been in use in Hampton for about three years.

In operation this pinion puller clamps over the pinion, pulls in a straight line and therefore can be applied to the armature without removing the latter from the motor. It has ample power to remove pinions of any size used in electric railway service and a few strokes on the operating lever are sufficient to start the most obstinate pinion. The jaws consist of two heavy steel castings held together by quick-acting clamps with the inside face machined to take hold of new or badly worn pinions. These jaws are furnished in two sizes, which together take in the range of pinions in ordinary use. The pinion puller weighs approximately 50 lb. and is provided with a handle for convenience in carrying. As the puller is portable it can be readily carried to the pinion to be removed.

In the rear of the repair shop there is rigged up a small dipping tank for cleaning housings, bearings, brake hangers and other truck parts. The dipping tank is an old metal oil barrel heated with gas and resting on the carriage of a small chain hoist by which the parts are lowered into the tank in a wire basket. The company is using with success a cleaning mixture called "Oakite Platers' Cleaner," which has been found to clean metal parts three or four times as rapidly as



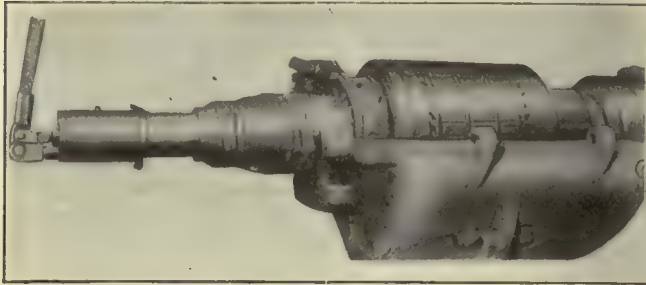
SECTION OF HYDRAULIC PINION PULLER

lye and to last almost indefinitely if about 10 per cent a week of the cleaner is added to the solution.

In the woodworking shop the company has recently installed a machine, illustrated in the accompanying

photograph, which performs a great many functions. It is a band saw, a trip saw, horizontal borer (used as a hollow chisel mortiser), a shaper and a joiner and has a planer attachment. It was made by the Sidney Machine Tool Company of Sidney, Ohio.

In its electrical department the company has a rig for testing circuit breakers by which it is possible to



REMOVING A PINION WITH HYDRAULIC PULLER

duplicate the conditions, so far as position is concerned, of those in which the circuit breaker is placed on the car. It consists of a frame which can be set at any angle by means of a pawl and ratchet. After the circuit breaker to be tested is bolted to the frame, the latter may be set vertically or horizontally, at 45 deg. or at any other angle in which the circuit breaker is attached to the car. In this way the calibration of the breaker can be made more accurate than if the test was conducted only in the one position.

During 1921 the company got a mileage from its brake shoes of 15,500 and from its trolley wheels of 7,000. The mileage per failure last year was 5,800, or 1.11 per cent of the cars operated.

Window Wiper Speeds Up Operation

SO MUCH trouble has been experienced by motormen when the glass window pane in front of them becomes obscured in bad weather that some sort of mechanical window wiper is a necessity. The type shown in the



MECHANICAL WINDOW WIPER IN MILWAUKEE

accompanying illustration was developed in the Cold Springs shops of the Milwaukee Electric Railway & Light Company. This device permits the motorman to clean the outside glass surface without having to move

from his customary place. He operates the device by turning slightly the handle that is located on the inside window framing. The wiper, which is formed of a rubber strip in a metal holder, moves radially in a vertical plane across the glass surface. This holder is attached to the outer end of an arm of roundbar steel which passes through the window framing. The device is inexpensive, simple in construction and has been installed on more than 1,000 cars of the Milwaukee system.

What's New from the Manufacturers

Cost of Thermit Welds Reduced

AS A result of an investigation by the research department of the Metal & Thermit Corporation, New York, to reduce the cost of Thermit welding, it has been found that economies amounting to 10 per cent or more can be made in regard to the amount of Thermit required to make a weld. These result from reducing

THERMIT REQUIRED FOR WELDING VARIOUS SECTIONS

Width of Section, In.	Depth of Section, In.	Width, of Gap, In.	Width of Thermit Steel Collar, In.	Thickness of Thermit Steel Collar Center, In.	Heat, Gate, In.	*Pour Gate, In.	Riser Dia., In.	Recommended Amount, Lb.
3	2	1/4	2 1/2	1/4	1	1	1	10
3	2 1/2	1/4	2 1/2	1/4	1	1	1	12
3	3	1/4	3	1/4	1	1	1	16
3	3 1/2	1/4	3 1/2	1/4	1	1	1	25
4	4	1/4	4	1/4	1	1	2	40
4	4 1/2	1/4	4 1/2	1/4	1	1	2	45
4	5	1/4	4 1/2	1/4	1	1	2	50
4	5 1/2	1/4	4 1/2	1/4	1	1	2	65
4	6	1/4	4 1/2	1/4	1	1	2 1/2	65
4	6 1/2	1/4	4 1/2	1/4	1	1	2 1/2	75
4	5	1/4	4 1/2	1/4	1	1	2 1/2	75
4	5 1/2	1/4	5 1/2	1/4	1	1	2 1/2	80
5	5 1/2	1/4	5 1/2	1/4	1	1	2 1/2	85
5	6	1/4	5 1/2	1/4	1	1	2 1/2	90
5	6 1/2	1/4	5 1/2	1/4	1	1	2 1/2	90
5 1/2	6 1/2	1/4	6	1/4	1	1	3	105
5 1/2	7	1/4	6	1/4	1	1	3	100
6	6 1/2	1/4	6 1/2	1/4	1	1	3	115
6	7	1/4	6 1/2	1/4	1	1	3 1/2	125
6 1/2	7	1/4	6 1/2	1/4	1	1	3 1/2	130
6 1/2	8	1/4	7	1/4	1	1	3 1/2	140
7	7	1/4	7	1/4	1	1	3 1/2	150

*Diameters shown above for pouring gates are mean diameters. In practice these pouring gates should be tapered, bottom diameter being approximately 1/4 in. less and top diameter approximately 1/4 in. greater than dimensions given.

the size of the collars or reinforcements of Thermit steel, also from narrowing the gap and changing the proportions of gates and risers. For instance, a weld of a 2-in. x 3-in. section, for which 40 lb. of railroad Thermit used to be recommended, now can be made with only 10 lb. of Thermit. On a 3-in. x 4-in. section, where 55 lb. was formerly recommended, 25 lb. only is needed providing the size of collar, width of gap and size of the various gates are proportioned in accordance with the dimensions now found best.

The accompanying table gives the width of gap, width and thickness of collar, size of gates and quantity of Thermit which are now recommended in welding various sections from 3 in. x 2 in. in size up to 7 in. x 7 in.

New Syphon Sprayer Gun

THE accompanying illustration shows a form of syphon sprayer for cleaning and applying liquids of various kinds by means of compressed air. This is being introduced under the trade name of "Perfection Engine and Machine Washer," by M. W. Bailey, New York, N. Y. The complete equipment includes 6 ft. of oil-proof flexible metal hose, an air hose, a handle, a steel nozzle, and a 12-in. extension nozzle. The gun is used for applying wood preservatives, insecticides, creosote, paint, whitewash, etc., or wherever a syphon sprayer can be used to advantage. Several electric railways are using the gun for cleaning gear cases and truck parts. The gun is operated by pressing the valve button and a direct spray follows. The air pressure has a tendency to break the oil or solvent into a fine spray which is effective for cleaning.



SYPHON SPRAYER GUN

Lead Alloy Bearing Metal Developed

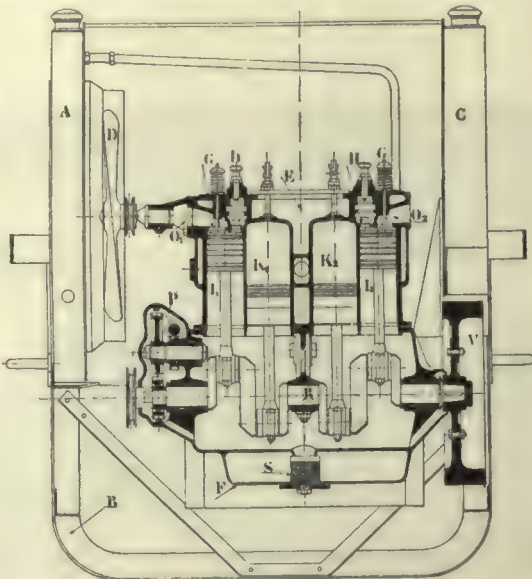
THE United Lead Company has brought out an electrolytically produced calcium-barium-lead alloy that is claimed to possess all the requisites of a good bearing metal. Frary metal, as it is called, is said to have good anti-frictional properties, since it retains largely the characteristics of lead in respect to plasticity. It is claimed that the property of this alloy of maintaining its hardness and strength at high temperature makes it a successful bearing metal. Its high melting point also partly accounts for this. The manufacturers say that it has the greatest hardness compatible with the necessary plasticity, but this hardness is much less than that of an axle or shaft so that in case of a dry bearing the axle is not scored, but the bearing metal itself suffers. Under working conditions the metal gradually develops fibrous structure and will take a very high polish under the revolving action of the shaft and lubricant. The pouring and molding practice with Frary metal is not different from that of any other bearing material. Its principal physical characteristics are as follows: Tensile strength, 13,000 lb. per square inch; hardness, 20 to 30 Brinell; specific gravity, 11; melting point, 562 deg. F.; pouring temperature, 800 deg. F.; resistivity, 188 ohms per circ.mil-ft. The tensile strength of ordinary babbitt metal is about 10,600 lb. per square inch. A number of electric railways are already using this bearing metal on some of their cars. The accompanying table gives some results of bearings that

were removed from service for inspection. All of these presented a smooth, shiny surface and none had worn down to the point requiring recasting. The remaining bearings of the various sets are still in use.

Light, Self-Contained Gasoline-Motor Air Compressor

For War Work in Drilling with Air, Etc., an Italian Automobile Manufacturer Developed a Novel Type of Compressor Which Has Now Been Made Available for General Use

DURING the war the Diatto Automobile Company of Italy was called upon to produce a light, portable air compressor with automobile gasoline-engine drive. The experience thus gained has been utilized in a peacetime machine of this type which is now being manufactured in more than one country of Europe. The machine consists essentially of four cylinders in one block, two being engine cylinders and two compressor cylinders. Their pistons are connected to the same



CROSS-SECTION OF DIATTO GASOLINE-MOTOR COMPRESSOR

A—Radiator. B—Angle-iron frame. C—Gasoline tank. D—Fan. E—Compressed-air chamber. F—Oil case. G, G—Cam-operated air inlet valves. H, H—Automatic air outlet valves. I₁, I₂—Compressor cylinders. K₁, K₂—Motor cylinders. O₁, O₂—Air inlets to compressors. P—Water circulating pump. R—Crankshaft. S—Oil strainer. V—Flywheel. crankshaft, which carries a flywheel and a starting crank, and the engine valves are controlled by means of a camshaft. The engine as a whole is cooled by means of an automobile radiator and fan, and a pump is provided to circulate water around the compressor cylinders. In the wartime and present designs portability has been a prime consideration, both as regards lightness and convenience of taking apart and assembling. The compact construction and the high engine speed (nor-

	Number of Bearings	Total Weight of Car	Maximum Speed M.P.H.	Mileage	Time in Use, Months	Loss in Weight, Ounces	Type of Bearings
Cincinnati & Cincinnati Traction Company	8	102,000	80	77,635	11	7	solid
Chicago & Lake Erie Traction Company	8	63,200	35	37,296	11	..	solid
New York, Westchester & Boston	8	120,000	42	68,017	13	..	lined
Connecticut Railway	8	69,620	50	19,922	5	16	solid
Western Ohio Railway	8	66,000	..	40,000	5 1/2	..	solid
Cincinnati Traction Company	4*	34,400	..	9,126	2 1/2	10	solid
New York, New Haven & Hartford Railroad	11	234,640	40	102,947	26	..	lined

*Does not include two pony trucks.

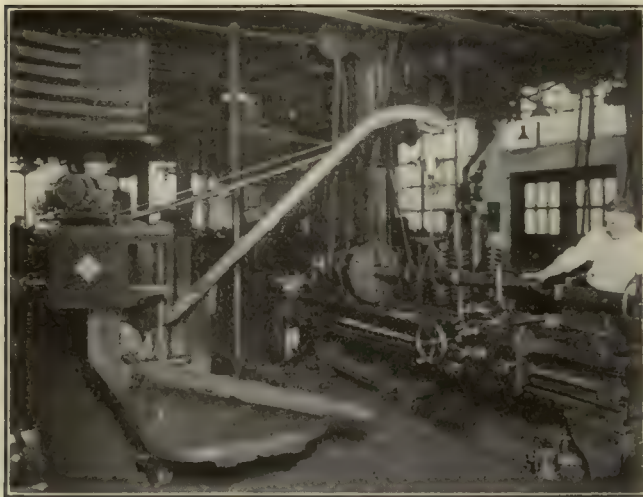
mally 1,500 r.p.m.) make lightness possible, and the general mechanical design favors the other advantages mentioned.

In the standard size described in the Jan. 28 issue of the *Génie Civil*, Paris, the motor-compressor unit weighs 794 lb., and is 4 ft. 1 in. long and high. When taken apart it consists of the motor compressor proper, weighing 254 lb., and three other pieces weighing from 175 lb. to 200 lb. each. It produces a pressure of 120 lb. per square inch, and can deliver over 50 cu.ft. of air per minute against this head. The unit can be mounted either on skids (a construction covered by the weights mentioned above) or on a wheel truck.

New Crane Truck for Shop Use

THE Elwell-Parker Electric Company, Cleveland, Ohio, has recently developed a new electric truck equipped with a revolving counterbalanced crane of unusual length. It is particularly adaptable for handling supplies in storerooms and in storage yards, as well as for serving various machine tools in railway machine shops.

The heavy vertical steel column has a long bearing in a pedestal which is bolted to the steel platform on the truck and supports a 12-ft. boom which may be racked



CRANE TRUCK SERVING SHOP MACHINE

in or out by the operator without leaving the driving position. The hoist is operated by a separate motor direct connected to an inclosed hoist mechanism. The controller is located on the dash in front of the crane operator. The hoist is mounted on a steel frame which houses the batteries, hoist and motors, all acting as a counterbalance. A special trip switch mounted on the front battery box stops the inward motion of the boom as set.

The crane is designed to pick up 1,000 lb. at an 8-ft. outreach, or with outriggers in position it will handle 3,000 lb. at 6-ft. outreach. The truck is equipped with 21½-in. x 3½-in. drive wheels and 15-in. x 3½-in. trailing wheels, all four of which steer. A coupler is furnished on the rear to permit using the unit for intermittent tractor service if occasion demands. Motors, differential worms, wheels and crane-pillar columns are all fitted with ball bearings. A single battery furnishes power to propel the truck as well as to operate the crane. The truck has a carrying capacity of 3,000 lb. One of the smaller though important details is the attachment or charging plug. Each battery is equipped with the receptacle end of this plug.

Weighting Lanterns to Keep Them in Position

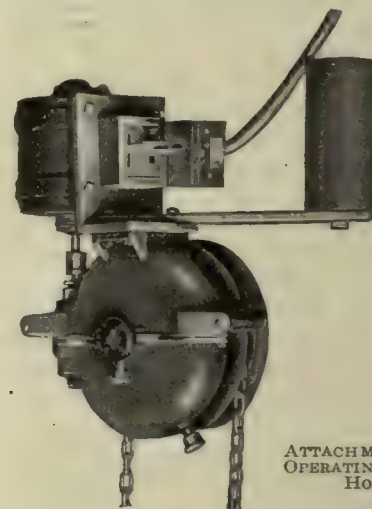


THE accompanying illustration shows a lantern attached to a Dr. Sentry lantern holder. This holder is built of iron and weighs 6 lb. A tension spring is provided in the base that it will fit a size lantern. The socket is also provided for the insertion of the standard for a red flag if desired. The use of this holder prevents lanterns from being overturned by wind or storm and also prevents breakage. Wherever railway

construction or repair work requires a guarding light such a holder will be found of value.

New Electric Chain Hoist Attachment

THE accompanying illustration shows a new electrically driven attachment designed so that it can be suspended in the bight of the operating chain of a hand hoist. It has a capacity to overhaul 138 ft. of chain per minute and a chain pull of 130 lb. This gives



ATTACHMENT FOR OPERATING CHAIN HOIST

a load-lifting speed of approximately four times that obtainable by hand power. The machine weighs 160 lb. It is being placed on the market by the New Jersey Foundry & Machine Company, New York, N. Y.

Improved Concrete Mixing Machine

THE Foote Company, Inc., Nunda, N. Y., is bringing out a new model paving mixer, 21-E. This model is similar to the old type 21-E, except that it is 6 in. longer in tread and frame construction and has a larger capacity drum. The new machine is rated at the same capacity as the previous type, but will have a plus capacity.

American Association News

Recent Engineering Association Committee Gatherings

THESE days are busy ones for the Engineering Association committees. The committee on way matters met March 29 and 30, as reported in the April 8 issue, page 605. Last week's meetings are covered below:

BUILDINGS AND STRUCTURES

The committee on buildings and structures met at the offices of the Cincinnati (Ohio) Traction Company on April 3. In attendance were: Frank L. Miller, Louisville Railway, chairman; E. H. Berry, Cincinnati Traction Company; J. R. McKay, Indiana Service Corporation, and L. C. Mayer, New York Railways.

On the subject of shop layouts, blue prints and data furnished by N. E. Rexler were examined and referred to the appropriate sub-committee for digest. Similarly, other assignments were referred to sub-committee chairman, all of whom will forward their reports to Chairman Miller by May 1. The committee was also apprised of the work of the railways bureau of the Portland Cement Association to furnish accurate information on cement and concrete. The next meeting was appointed to be held in Pittsburgh during the first week of June.

POWER DISTRIBUTION

A two-day meeting of the committee on power distribution was held in New York City April 3 and 4. Chairman M. B. Rosevear, Public Service Railway, presided and present also were the following: J. R. C. Armstrong, Brooklyn City Railroad; C. C. Beck, Ohio Brass Company; H. S. Burd, National Conduit & Cable Company; C. A. Bucher, Westinghouse Electric & Manufacturing Company; R. W. Eaton, public service engineer, Providence, R. I.; L. F. Griffith, Little Rock (Ark.) Railway & Electric Company; H. D. Hyks, Anaconda Copper Mining Company; Adrian Hughes, Jr., United Railways & Electric Company, Baltimore; F. McVittie, New York State Railways, Rochester; H. S. Murphy, Philadelphia Rapid Transit Company; G. Hall Roosevelt, General Electric Company; F. J. White, the Okonite Company.

Mr. Rosevear reported regarding the conference on overhead crossings held under the auspices of the American Engineering Standards Committee. (See ELECTRIC RAILWAY JOURNAL, March 11, 1922, pages 393 and 414.) He said that the steering committee appointed at the conference, on which the American Association has but two representatives, is considering the inclusion of Part 4 of the National Electric Safety Code. An effort will be made to increase the representation of the association.

The chairman also called attention to the importance of co-operation with other associations regarding inductive interference and the committee referred his suggestion to the executive committee.

In the same general field the following motion was passed:

We recommend to the executive committee that by means of letters to company members, publicity in *Aera*, or any other available methods, member companies be requested to co-operate in keeping the association advised of pending or contemplated action by public authorities in establishing laws or regulations in engineering matters affecting construction or operation; also that association headquarters should be similarly advised regarding pending or contemplated establishment of recommended practices or standards by associations or others.

In regard to the activities of sub-committees which are studying subjects already referred to the A. E. S. C. it was voted that they co-operate actively with representatives of the Engineering Association on A. E. S. C. committees.

The wear and the composition of trolley wire were extensively discussed by the committee and arrangements were made to secure experimental data. The A. S. T. M. will be approached, also, with a view to agreement on a joint specification.

The 1921 report of the American Committee on Electrolysis was next discussed, and arrangements were made to co-ordinate, through Mr. Hughes, the comments of the way, power generation and power distribution committees.

Finally Mr. Roosevelt reported on the plan for a thesis on the automatic substation, to include average data secured by canvass as applied to a special case of urban transportation.

EQUIPMENT COMMITTEE

A two-day session of the equipment committee of the Engineering Association was held in New York April 5 and 6. Those present were R. H. Dagleish, Capital Traction Company, Washington, D. C., chairman; Daniel Durie, sponsor, West Penn Railways, Pittsburgh, Pa.; W. S. Adams, the J. G. Brill Company; H. A. Benedict, Public Service Railway of New Jersey; L. J. Davis, Brooklyn City Railroad; J. L. Gould, Wilmington & Philadelphia Traction Company; Stuart Hazelwood, Midvale Steel & Ordnance Company; J. M. Hipple, Westinghouse Electric & Manufacturing Company; A. J. Miller, Association of Manufacturers of Chilled Car Wheels; M. O'Brien, United Railways of St. Louis; E. D. Priest, General Electric Company; P. V. C. See, Northern Ohio Traction & Light Company; C. W. Squier, ELECTRIC RAILWAY JOURNAL; R. W. Steigerwalt (representing C. F. W. Rys), Carnegie Steel Company; A. Scheer, Jr., Public Service Railway, and N. B. Trist, Carnegie Steel Company. The last-

named two were present by invitation.

The first day was taken up with meetings of sub-committees, in formulating reports for consideration by the committee as a whole on Thursday.

The subject of wheel contours was first discussed by the full committee. R. C. Cram and V. Angerer, representing the committee on way matters, took part in this discussion. The equipment committee concluded that standard contours for chilled iron wheels should be prepared for presentation in the annual report and that certain additions and modifications should be made to the flange contours for steel wheels. As to the recommendation of the way committee for a curved contour of wheels, the equipment committee felt that it would be impracticable to turn wheels to the contour recommended and, further, that wheels as actually turned to contours now recommended differ very slightly from the new contour proposed.

The sub-committee on helical gears presented a compilation of answers received to a questionnaire on this subject. The information received by the questionnaire method was considered to be of insufficient value to warrant its continuance. To arrange for more definite and accurate information, it was suggested that the representatives of the General Electric and Westinghouse Companies submit a list of questions which will aid in bringing about a clear understanding of conditions, for consideration at the next meeting.

The subject of trolley contact devices was discussed and some replies to a questionnaire which had been sent out were examined. The replies received so far are insufficient for definite conclusions. The chairman of this committee will tabulate answers as they are received and submit recommendations with his report at the next meeting.

A very complete report was given by the chairman of the sub-committee on possible revisions of existing standards and specifications. The recommendations included allowance for press fit for solid gears, a flange of the gear seat on axles, additional wheel contours and fillets for standard axles and journal bearings. The recommendations decided on will be incorporated in the final report to be submitted at the next meeting, which will be held the latter part of May.

PURCHASES AND STORES

A meeting of the committee on purchases and stores of the Engineering Association, held in New York City, on April 7, was attended by W. H. Staub, United Railways & Electric Company, Baltimore, Md., chairman; William C. Bell, Virginia Railway & Power Company; J. F. Fleming, Capital Traction Company; C. A. Harris, Pittsburgh Railways, and W. S. Stackpole, Public Service Railway of New Jersey. The subject of proper methods of taking periodical inventories with a view to adopting standard forms was discussed in considerable detail. The

committee concluded that the inventory problem is closely associated with the work of the accounting department and that general procedure is difficult to formulate. To provide information as to various details in taking inventories, it was decided that each member of the committee should prepare a state-

ment, accompanied by various forms used, showing in detail the methods used by his company. In addition each member will undertake to obtain similar statements from several companies in his immediate vicinity. In this way a large amount of information will be obtained for study and decision.

be reflected in an appreciable direct saving to the industry as a whole and increased efficiency and productivity of all co-operative effort.

Standardization of Paving Brick

THE National Paving Brick Manufacturers' Association has sent out a report of progress in the elimination of unnecessary types and sizes of paving brick. The movement is a result of the effort of Secretary Herbert Hoover to eliminate waste in industry.

On March 27 there was held in Washington the first meeting of a permanent committee, representing producers and buyers, which was appointed at a preliminary meeting held Nov. 11, 1921.

The permanent committee organized by electing E. J. Mehren, editor of *Engineering News-Record*, as chairman and H. R. Colwell of the Department of Commerce as secretary. Organizations were represented as follows: A. Hull, Bureau of Standards; Will Blair, American Society for Testing Materials; Col. R. Keith Compton, Federated American Engineering Societies; M. B. Greenough, National Paving Brick Manufacturers' Association; C. Herrick, American Association of State Highway Officials; E. W. McCullough, Chamber of Commerce of the United States; V. M. Pierce, United States Bureau of Public Roads, and A. Durgin, chief division of simplified practice, Department of Commerce. The American Society for Municipal Improvements was represented by Colonel Compton in the absence of G. Fiske, the society's regular delegate.

The committee was informed that following organizations already formally approved the first eliminations, reducing the number of brick sizes and types from sixty-six to eleven. National Paving Brick Manufacturers' Association, American Association of State Highway Officials, American Institute of Architects, American Ceramic Society, Engineers' Club of Columbus, American Society of Civil Engineers, and the Departments of Agriculture, Commerce, the Interior, the Navy and War.

After considering new data as to total shipments of vitrified brick in 1921 the committee voted unanimously to eliminate the following sizes: Vertical fiber lug, 3 x 4 x 8½ in.; vertical fiber lug, 3½ x 4 x 8½ in.; wire-cut Hillside, 3½ x 4 x 8½ in.; repressed 3½ x 3½ x 8½.

The following remain as the standardized recognized types and sizes: Plain wire-cut, 3 x 4 x 8½ in.; plain wire-cut, 4 x 8½ in.; repressed lug, 3½ x 4 x 8½ in.; wire-cut lug, 3½ x 4 x 8½ in.; wire-cut lug, 3½ x 3½ x 8½ in.; wire-cut 3½ x 3 x 8½ in.; repressed Hillside 4 x 8½ in.

The committee decided that with the eliminations it had proceeded as far as was desirable until there are further reactions from producers and consumers. It was therefore concluded that further eliminations would be considered until March 23, 1923, when on 1922 shipments will be available

News of Other Associations

Schedule of the C.E.R.A. Cruise

SUPPLEMENTING the announcement of the six-day summer cruise of the Central Electric Railway Association, given in the issue of this paper for March 4, page 375, is the following detailed schedule, which has just been announced:

SCHEDULE FOR C.E.R.A. CRUISE— STANDARD CENTRAL TIME

East Bound			
Lve. Chicago	Sunday	10:00 a.m.	June 25
Arr. Benton Harbor	Sunday	2:00 p.m.	June 25
Lve. Benton Harbor	Sunday	3:00 p.m.	June 25
Arr. Mackinac	Monday	11:00 a.m.	June 26
Lve. Mackinac	Monday	1:00 p.m.	June 26
Arr. Detroit	Tuesday	8:00 a.m.	June 27
Lve. Detroit	Tuesday	8:15 a.m.	June 27
Arr. Toledo	Tuesday	1:15 p.m.	June 27
Lve. Toledo	Tuesday	1:30 p.m.	June 27
Arr. Cleveland	Tuesday	8:15 p.m.	June 27
West Bound			
Lve. Cleveland	Tuesday	8:30 p.m.	June 27
Pass Detroit	Wednesday	6:00 a.m.	June 28
Pass Port Huron	Wednesday	12:00 noon	June 28
Arr. Charlevoix	Thursday	7:00 a.m.	June 29
Lve. Charlevoix	Thursday	9:00 a.m.	June 29
Arr. Traverse City	Thursday	12:00 a.m.	June 29
Lve. Traverse City	Thursday	2:00 p.m.	June 30
Arr. Macatawa	Friday	6:00 a.m.	June 30
Lve. Macatawa	Friday	6:30 a.m.	June 30
Arr. Benton Harbor	Friday	10:00 a.m.	June 30
Lve. Benton Harbor	Friday	11:30 a.m.	June 30
Arr. Chicago	Friday	3:30 p.m.	June 30

For the accommodation of members of the party who desire to board the



ROUTE OF THE C.E.R.A. CRUISE

steamer at Chicago on Saturday evening, June 24, arrangements have been made for them to do so after 6 o'clock and have breakfast on the boat Sunday morning at a nominal price. The cost of the complete trip will be \$65, and parts of the trip may be taken at appropriate rates. Members of the association may invite friends to accompany them on the trip, but these must be specially invited and tickets for them secured through the member extending the invitation.

The committee on arrangements for the cruise comprises S. D. Hutchins, chairman; John Benham, secretary; James H. Drew, Carlos Dorticos and Harry L. Brown.

Iowa Association to Meet June 23

THE annual meeting of the Iowa Electric Railway Association will be held at the Inn Hotel, Lake Okoboji, on Friday, June 23. The morning will be taken up with technical discussions and the afternoon with entertainment.

The meeting will be held immediately after the annual meeting of the Iowa Section, National Electric Light Association, and at the same place.

A. S. M. E. Addresses Are Broadcast

ON APRIL 4 messages to engineers of America, by President Dexter S. Kimball and Secretary Calvin W. Rice, of the American Society of Mechanical Engineers, were broadcast from the General Electric Station, Schenectady. The messages were heard at points as widely distant as San Francisco, Havana and the City of Mexico.

Conference on Association Waste

AT THE last meeting of the executive committee of the Society for Electrical Development a committee was appointed, consisting of C. L. Edgar of the Edison Electric Illuminating Company of Boston and E. W. Rockafellow of the Western Electric Company, to be known as its conservation committee. The purpose of this committee is to act with similar committees from other national associations in the electrical industry and avoid duplication of effort in their activities. An invitation has been extended by the society to these other organizations to appoint a similar representation to serve on a joint committee to discuss and define the most constructive and logical fields of effort for each association and effect an agreement which will eliminate overlapping and waste of resources.

It is hoped by the society that the other associations will appreciate the importance to the industry of the fulfillment of this plan and will respond to its invitation promptly and enthusiastically. It believes there is a steadily increasing tendency to criticize existing conditions, and any conservation of effort in association work will

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Compromise in New Orleans

Valuation of \$44,700,000 and Rate of Return at Seven and One-half per Cent Sustained

The Commission Council of the City of New Orleans, La., and the representatives of the security holders of the New Orleans Railway & Light Company compromised their differences on April 1, and the Commission Council by a vote of 4 to 1 (Mayor McShane dissenting) approved the settlement reached by the conferees. Under the rules of procedure in the City Council, the compromise ordinance will have to lie over for another week before it is finally formally ratified. Every provision in the agreement reached last fall, when the conference was interrupted by court order, was sustained by the Commission Council, except that provision placing a rate return upon new money to be added for improvements and extensions of the service.

The valuation is placed at \$44,700,000 and the rate of return on both old and new money is fixed at 7½ per cent. Fare for school children over which the conferees had some dispute was left unchanged unless conditions in the future will warrant a lower rate of fare.

S. Hecht, president of the Hibernia National Trust & Savings Bank, chairman of the 4½ per cent bondholders, through whose efforts the compromise was very largely brought about, with the aid of G. M. Dahl, vice-president of the Chase National Bank of New York City and C. C. Chappelle, was greatly delighted over the agreement reached, declaring that the settlement was fair both to the city and to the security holders.

ADVANTAGE OF AGREEMENT CITED

Commissioner Paul Maloney, of the Department of Public Utilities, summarizing some of the advantages which will accrue to New Orleans as the result of the compromise, said that under the agreement the president of the New Orleans Railway & Light Company must live in New Orleans, and two-thirds of the board of directors must be Orleansians; securities cannot be sold without the approval of the Commission Council; the transfer system is to continue; the Council is to have access to the books and supervise the operations of the company; real estate owned by the company and not needed to be sold and the proceeds put into equipment; the city to have a perpetual option to purchase the properties; one-third of a reserve fund of \$300,000, set aside yearly, to be reinvested in the property and the other half in liquidating bonds; all dividends in common stock at the time of reorganization to

be reinvested in the property; no stock dividends to be declared and the rate of cash dividends to be limited. The return to be limited.

A great deal of time will have to be expended before reorganization may be effected, according to H. Generes Dufour, counsel for the New Orleans Railway & Light Company. The first thing to be done will be to bring foreclosure proceedings by the holders of the 4½ per cent bonds for default on interest. This action will have to be taken by the New York Trust Company, trustee for the bondholders. After the filing of the bill of foreclosure, Special Master in Chancery D. B. H. Chaffe will have to call a hearing to take testimony on which he will base his formal report. Twenty days must then intervene before a decree of foreclosure is entered. The court will then order the property to be advertised and sold, when the bondholders will step in. With the filing of the master's deed, which will be the title to the property, transfer will be made to the purchaser's nominee, which will be the new company.

The receiver will then step out. The new company will then elect its officers, issue its securities and reduce the rates of fare and gas. The bill of foreclosure will probably be filed by the end of the present month.

Wage Dispute Hearings Begin

Presentation of arguments by both parties to the wage dispute between the Indiana, Columbus & Eastern Traction Company and its trainmen was expected to consume three days in the hearings which began before the board of arbitration at the company's offices in Springfield, Ohio, April 13. At the conclusion of the arguments, the board of arbitration will endeavor to arrive at a decision, by which both sides have agreed to abide.

Employees of the company are being represented by James Largay, an official of their union, while the company is being represented by Receiver J. H. McClure and Attorney Paul C. Martin. Pending the adjustment of the controversy, the company is paying 45 cents an hour to the trainmen, a reduction of 4 cents from the former scale, and the rate which the company seeks to continue. Up to last August the trainmen were receiving 60 cents an hour.

The three members of the arbitration board are S. D. Hutchins of Columbus, representing the traction company; George Rightmeyer, professor of law at Ohio State University, Columbus, umpire, and C. W. Rich of Springfield, representing the men.

Plans Wage Cut

Wage Reductions of Detroit United Railway May Approximate Ten per Cent If Men Reject Arbitration

An effort is being made by the Detroit United Railway to reduce the wages of its motormen and conductors, and although difficulties are anticipated where the company and city are operating cars on the joint agreement, city officials believe the difficulties will be settled as they are confident that the electors will vote to take over the Detroit United Railway when the matter comes up next Monday, April 17. No reduction in wages of municipal street car employees is planned by the city. A conference has been arranged and the question will probably be settled by arbitration. The wage agreement entered into last May between the Detroit United Railway and its employees provides for arbitration of wage disputes and both the company and the employees have signified their willingness to arbitrate at the present time.

CUT NOT EXPECTED

Although the present agreement holds only to May 1, 1922, the employees did not expect a further reduction of wages at this time as a cut was accepted last year. According to W. D. Mahon, president of the Amalgamated Association of Street and Electric Railway Employees of America, either party has the privilege of demanding a readjustment of wages once a year by serving notice of its desire on April 1, and holding hearings by May 1.

It is understood that two questions will be considered, the wage scale and the question of overtime work. Although information was not given out as to the extent of the reduction that the company would ask, it was intimated that if the men rejected the arbitration a scale of 43, 46 and 49 cents an hour would be enforced. The present scale is 55, 58 and 60 cents an hour. These rates are paid to men after service of six months, nine months and one year respectfully. It is believed that the company will insist on a cut of about 10 per cent.

With the carrying out of the purchase plan, the city will hold complete control of the transportation situation in Detroit after May 15. Any differences can then be settled and wages for all municipal owned employees fixed. The Detroit United Railway will have its interurban employees to deal with.

According to Ross Schram, assistant general manager of the Detroit Municipal Railway, municipal employees are now averaging about \$32 weekly. Mr. Mahon stated that about 1,000 interurban employees of the De-

troit United Railway do not receive that much and the company's reduced operation has reduced the amount of work for the men.

It has been announced that the property of the Detroit Municipal System has been put on the assessors' books as valued at \$10,000,000 as compared with the valuation of \$1,000,000 one year ago. The Detroit United Railway property is assessed at \$21,000,000 and if the system is taken over by the voters, this valuation will be revised by the board of review.

Wage Agreement Reached

Old Rates of Pay Likely to Continue for Year in Rochester, Syracuse and Utica

Representatives of the employees of Rochester, Syracuse and Utica and representatives of the New York State Railways, operating the properties in each of these cities, reached an agreement on April 12 for the year that will begin May 1. The agreement is subject to ratification by the members of each of the three divisions, and James F. Hamilton, president of the New York State Railways, must be notified of the action of the men by April 20.

WAGE SCALE UNCHANGED

The agreement reached on April 12 leaves the wage scale the same as fixed in the existing contract. It provides for a separate contract for each of the three cities, and there are slight modifications in the working conditions for each city.

The contracts will be somewhat simplified, but will mean virtually the same to the men as does the one existing contract that affects all three cities.

The present wage scale varies from 49 cents to 53 cents an hour, according to length of service. The agreement reached on April 12 provides for a seven-day week of from nine to nine and one-half hours a day, according to the schedule of the various lines. It was pointed out that there is a large "extra" list at each carhouse and that an employee can take any day off he desires. Some of the men work only five or six days a week, while others work seven days.

In Schenectady the trolley employees held a meeting recently to discuss the action of the Schenectady Railway in notifying the union that the company did not intend to enter into a new agreement with the association May first. The company maintains the position that it had decided upon such program because of the financial losses suffered by the company due to situations brought about by the association because of unwise leadership. This criticism is directed against the union officials Walter Walter, president and Michael Ward, business agent.

MEN INDORSE THEIR LEADERS

It would appear that in Schenectady the attitude of the traction company will be to make a personal issue of the

leaders of the union, the same as was the policy of the United Traction Company last year in Albany. In spite of the criticism by the company the union passed a vote of confidence in its leaders. Mr. Ward stated he expected to hear from James F. Hamilton of Rochester at an early date in relation to a date for a conference between the men and the company officials.

Hearings Concluded

The New York Transit Commission on April 12 completed its hearings on the service given by the Interborough Rapid Transit Company, New York, N. Y., which were begun several weeks ago when the overcrowding in the rush hours in the subway became a cause of general alarm. New orders will be prepared by experts of the commission which Interborough officials claim will be accepted unless they are considered too drastic.

Franchise End Provided in Ordinance

An ordinance terminating the franchise of the Kentucky Traction & Terminal Company, Lexington, Ky., in Winchester is now before the Board of Commissioners. The terms of the contract under which the franchise is to be terminated provide that the railway company is to pay to the city of Winchester the sum of \$4,000.

The company is to remove certain of its tracks and to bear the expense of paving these streets for the space between rails of the track and a distance of 18 in. on either side of the track. The track on Main Street is assigned to the city of Winchester.

The franchise was granted to the traction company on Aug. 21, 1906, and would have terminated on Aug. 26, 1926.

Officials of the company already had announced their intention to cease operating the local railway system with the termination of the franchise. By terminating the contract now, the company will not have to lay tracks on streets which the city is paving only to tear them up at the end of four years.

Gary Motormen Given Vacation Bonus

Five days vacation with pay has been awarded to each of forty-six trainmen of the Gary (Ind.) Street Railway for having carried passengers during the entire year 1921 without a single accident. This plan of rewarding trainmen for careful operation was put into effect in 1919, but in that first year only three trainmen came up to the "no-accident" standard. In 1920 there were eighteen who received vacations with pay and the number increased again to forty-six last year. The vacations of the men on the roll of honor are allotted from May 1 to Oct. 31 and arrangements are made to grant ab-

sences on the dates desired, seniority prevailing in making selections.

As to whether the vacation bonus experiment has really brought results in reducing the number of accidents, the following figures are enlightening. During 1919 one personal injury occurred for every 47,857 passengers carried in 1920, one injury for every 62,613 passengers, and in 1921, one injury for every 94,053 passengers. In 1919 there was one vehicular accident for every 7,752 car-miles operated; in 1920, one vehicular accident for every 9,653 car-miles, and in 1921, one for every 12,133 car-miles.

On the showing made, Charles W. Chase, president, comments: "While we do not claim that the gratifying decrease in accidents is entirely due to the 'no-accident' bonus plan, yet we do believe that its operation has produced a material decrease in accidents and a great saving to the company as well as urging on the part of the men a greater instinctive regard for safe operation."

Traction Company Seeks to Recover Amount of Judgment

The Pennsylvania Railroad has been made defendant in a suit in which the Wheeling (W. Va.) Traction Company sues for sums of money aggregating \$56,000, with interest of various portions of this sum from dates specified in the petition. The suit is an aftermath of the fatal collision at Mertz crossing, between Bridgeport and Bellaire, on the evening of Feb. 8, 1916, in which a Pennsylvania locomotive demolished a Bellaire division car of the Wheeling Traction Company, resulting fatally to W. C. Stewart, prominent enamel ware manufacturer, and Motorman James H. King, and the severe injury of several passengers on the street car. The traction company is trying to recover from the railroad the amount of judgments rendered against it because of these fatalities and injuries.

Courtesy Importance Emphasized

Officials of the Indianapolis (Ind.) Street Railway have caused to be posted in prominent places in the cars of the company the following notice:

It is the desire of the employees and officials of the Indianapolis Street Railway Company that the patrons of this company be treated with courtesy at all times. Passengers will confer a favor by reporting to the superintendent, Room 314, Traction Terminal building, any case of discourteous treatment.

An official of the company said the notice was supplementary to the book of instructions issued to employees and also in addition to lectures on courtesy delivered at the different car stations. It was said the company demands courtesy on the part of the employees and the notices are being posted as announcement to the public that such courtesy is required. Officials express confidence the public will accord the courtesy to the company's employees.

Rejects Lease Plan

**Mitten Disapproves New "L" Draft—
Claims Rental Was the Only Issue
Not Formerly Agreed On**

President Thomas E. Mitten of the Philadelphia (Pa.) Rapid Transit Company has rejected the new lease plan formulated by Mayor Moore and recently submitted to the Council and the company. In a letter to the Mayor he said that he was not willing to discard the agreement reached after months of discussion. He said that at the Councilmanic meeting held on Jan. 9, 1922, all matters with respect to the lease were settled except the rental. Inclosed with the letter was a copy of the former lease tentatively agreed on.

It seems to be the general belief that Mr. Mitten will stand by the proposal assuming all operating losses during the first year of operation and then a graduated scale of return to the city amounting to 5 per cent in the sixth year of operation and thereafter. It is reported that Mr. Mitten's letter was entirely unsatisfactory to the Mayor.

The latest proposal by Mayor Moore on the operation of the Frankford Elevated line by the Philadelphia (Pa.) Rapid Transit Company was forwarded to the City Council on April 6, thus renewing the interrupted negotiations for an agreement on the management of this line. As was commented on editorially in the *Public Ledger* there is encouragement in this communication in that the Mayor does not stress the independent operation of the line but rather the importance of an "agreement with the Philadelphia Rapid Transit Company and the unification of the service under one management."

The outstanding feature of the new draft is the change in the rental clause. The original proposal contained a clause for a 5 per cent rental from the beginning of operation. The Mayor now recommends a sliding scale of rental commencing at 2 per cent on Jan. 1 next and increasing by increments of 1 per cent per annum until the maximum of 6 per cent is reached in 1927. A 1 per cent payment plan had been suggested by T. E. Mitten, president of the Philadelphia property. The proposed agreement is to be permanent or until 1957, when the 1907 agreement also will expire.

CHANGE IN RENTAL SUGGESTED

An important feature of the Mayor's letter is the fact that the city should share in the company's profits above the 6 per cent mark, remarking that the same treatment that is promised to stockholders should also be extended to the city. The new arrangement includes the establishment of a depreciation fund to take care of replacements necessitated by the wear on the city-owned cars to be used on the northeast line. The Mayor likens his draft to the one of March 31, 1921, in that no attempt is made to stipulate the rate of fare. In conclusion the letter said:

If this matter can be closed at an early date it is proposed immediately to bring

to the attention of your body the question of extension now agitating certain sections of the city where car riders are asking for increased service. These extensions include an arm of the Frankford L to provide high-speed service for the northern district of the city; also the Roosevelt Boulevard and cross-town lines, all of which are contingent upon the operation of the Frankford L.

In the proposal submitted by the Mayor to the Philadelphia Rapid Transit Company Oct. 1 has been set as the date when the Philadelphia Rapid Transit Company will begin operation of the Frankford line. The line will be given rent free until Jan. 1, 1923, when the new provisions of the lease will go into effect.

Railway Opposes Council's Request

The International Railway, Buffalo, N. Y., through its general counsel, C. J. Joyce of Philadelphia, attorney for the Mitten Management, Inc., has refused to allow the municipal authorities of Buffalo to make an examination of its books in connection with the pending rate case before the Public Service Commission. The City Council had asked Herbert G. Tulley, president of the International, to allow Milo R. Maltbie, the city's expert, to examine certain records for data not contained in the report to the state utilities board.

During a conference with the municipal authorities over the fare question, Mr. Joyce said the railroad had nothing to hide from its stockholders or the people of Buffalo, but he opposed the principle of opening the company's records to outside interests. The city contends that the report to the Public Service Commission does not give enough detail and the Council believes it has the right to examine the books of any public utility.

Relief Offered Injured Railway Employees

A new type of public service is being rendered by the Reconstruction Hospital, New York, N. Y., a hospital dedicated to the reconstruction of men and women injured anywhere in America in the industries. As a direct result of the worldwide experiments in rehabilitation of men injured in war, America has now a hospital the sole aim of which is to care for industrial diseases and accidents and the restoration of industrial casualties to active useful life. This hospital, with the breaking ground on April 2 for its new eleven story addition at 100th Street and Central Park West, now enters upon a national career, prepared to offer a unique service to industry. The specific purpose is to provide treatment which will not only restore the health of the injured workman but will give him back his full earning capacity as well. Electric railway employees injured in the performance of their duties may secure the necessary treatment at this hospital.

"Truth," a New A. E. R. A. Publication

A copy of *Truth* was sent under date of April 12 to members of the American Electric Railway Association. *Truth* is a clip sheet full of constructive facts about the electric railway industry, which the Committee on Co-operation of Manufacturers has had prepared for members of the association. A copy of *Truth* will be mailed to members each month, from the Advertising Section of the American Electric Railway Association.

The hope of the committee is that the member companies will get over to their employees the facts contained in this sheet. Companies that have a company publication are urged to reprint the material in *Truth*. Companies that put stuffers in pay envelopes are urged to use some of the material in them. Companies that have no printed medium are urged to use the material in talks with the men, and are being asked to put some of the facts in sales letters, or use the material in any other of the many ways which suggest themselves. The first issue of *Truth* appears as a single sheet, 8½ in. wide by 14 in. high. The foreword says:

Issued by the committee on publicity of the American Electric Railway Association, 8 West Fortieth Street, New York, for the use of persons and organizations co-operating in giving currency to facts about electric railway conditions. Material contained herein may be used as original matter—no credit being required—in house organs, company leaflets, newspaper interviews or releases, speeches, advertisements or in any other way desired. The association, however, vouches for the accuracy of all original statements contained, and it may be given as the source of information whenever preferable to do so.

Efforts Made to Place Franchise Rights with Commission

It has been announced that the California Real Estate Association plans to place in circulation a petition for the purpose of an initiative measure to amend the State Constitution to give the State Railroad Commission the power to grant franchises to public utilities operating within or without municipalities. A tentative draft of the proposed amendment was prepared at the request of Chris R. Jones, regional director of the Real Estate Association, at the State Capitol.

In this connection, W. V. Hill, manager of the California Electric Railways Association, has issued a statement claiming that the present franchise obligations of electric railways in California are burdensome to the extent of being the cause of financial distress for the carriers. Further franchises will be assumed only under much different conditions than those assumed by the railways in the past. He said that in the larger cities of the State, with the exception of Oakland, franchises were limited to from twenty to twenty-five years and little business sagacity was required to see the difficulty of financing a property with bonds whose life extended beyond the franchise period.

Reduces Wages Five Cents an Hour

The Manchester Traction, Light & Power Company, Manchester, N. H., has announced a wage reduction of 5 cents an hour affecting employees of the Manchester Street Railway, the Manchester & Derry Street Railway and the Manchester & Nashua Street Railway. The new rates, effective April 1, 1922, to April 1, 1923, in cents per hour are as follows:

Conductors and motormen	
First three months	45
Next nine months	50
Thereafter	55
The rate established for overtime is one-fifth of the regular rate, and the morning reporting time rate is reduced 60 per cent.	
Snow plow work	
Motormen	70
Sixteen trackmen	60
Outside men	company to make price.
Carhouse men	
Day foreman	\$46.15 per week
Night foreman	67½
Night repair man	52
Bolt man	56
Air brake and miscellaneous men	66
Painter—foreman	70
Blacksmiths, pitmen and painters	59
Armature winders	73
Head inspector of equipment	62
Other inspectors of equipment	59
Helpers, car sweepers and cleaners	51
Trackmen	
Track foreman	\$45.56 per week
Seven permanent trackmen	53½
Nine permanent trackmen	50
Linenmen	
Foreman	74½
Linenman	66
Linenman	60

The rates of wages for motormen and conductors in effect from April 1, 1920, to April 1, 1921, were 50, 55 and 60 cents per hour. From April 1, 1921, to July 15, 1921, this agreement was modified so that a reduction of 5 cents per hour was in effect during that period. After July 15, 1921, the schedule April 1, 1920, to April 1, 1921, was in force.

Service to Be Resumed in Augusta

Service will probably be resumed in Augusta by the Augusta-Aiken Railway & Electric Company on Saturday, April 15. News to this effect was contained in a telegram received from Augusta on April 14 in which the information was conveyed that the City Council on the night of April 12 had passed resolutions regulating the jitneys. As Friday was a holiday in financial circles in New York it was impossible to secure any further details from the J. G. White Management Corporation before going to press. That the situation in Augusta was fast heading toward an adjustment is indicated in the following account of some of the recent moves made there in connection with the controversy.

Mayor Julian M. Smith was requested by members of the Council of Augusta, Ga., to call a special meeting of that body for April 12 to discuss and act on the jitney and electric railway controversy.

Charles S. Banghart, vice-president and general manager of the company, had previously indicated to the Council that the executive committee of the company had declined to authorize him to put cars in operation again on the

terms which had been suggested by the committee of the Council. The attitude of the executive committee was that it had been demonstrated by experiment that the company could not make actual operating expenses on the terms suggested by the committee.

Mr. Banghart indicated that if the city could see its way clear to remove the jitneys two blocks from car lines, instead of one, and prevent them from taking on and discharging passengers within two blocks of any trolley line, his company would re-start the cars, adopting the schedules mentioned in the committees' proposal and put on a 7-cent, instead of an 8-cent token fare for the general public, a 5-cent fare for school children and teachers. There would, however, have to be a 10-cent fare for the casual rider who refuses to buy 7-cent tokens. Mr. Banghart said:

If the city should not find itself able to remove the jitneys two blocks as above set forth, but only one block as stated in the committee's proposal then the company in its excessive desire to meet the wishes of the public for restoring car service in the city will consent to this modification on condition that jitneys are not to cross Broad Street and that if after thirty days' trial the jitney competition still materially cuts into the railway's legitimate revenue, the city will then consent to remove them two blocks and in default the company is to be free to exercise its legal right again to stop the cars.

Millions for Improvements

Anticipating formal ratification at its next meeting by the Commission Council of New Orleans, La., of the agreement reached by the Council and the representatives of the security holders of the New Orleans Railway & Light Company, Commissioner Maloney on April 11, addressed himself to Receiver J. D. O'Keefe, on the subject of the immediate purchase of 100 new cars. The estimated expense of the equipment is said to be \$1,000,000. The cars may now be purchased as under the agreement now reached several million dollars will be provided for improvements, which will include rehabilitation of the electric department by providing more power. The company's equipment at present consists of 550 cars, of which number only 475 cars are in operation.

Service-at-Cost Measure Signed

Governor Miller of New York has signed the Dick bill amending the public service commission law. The new measure defines service-at-cost contracts and authorizes municipal corporations with less than 1,000,000 population and street surface railroad corporations to enter into these contracts after public service commission approval.

A service-at-cost contract is defined to be an agreement between a municipal corporation and a street surface railroad corporation, providing generally for operation of a street surface railroad, wholly or partly in the limits of the municipal corporation, with a rate of fare directly or indirectly dependent on the excess of revenues after deduction of expenses and charges. All municipal corporations having less than

1,000,000 population and street railroad corporations now existing or which shall hereafter exist, may enter into such a contract. A ten days' notice to the Public Service Commission is required for its approval, which may be given to any such contract entered into after July 1, 1920.

No provision of any law, general or special, unless the contrary is specifically stated in such a law subsequently in effect, shall be deemed to interfere with the service-at-cost contract authorized by the new law.

Car Shops Burn in Oshkosh

The Eastern Wisconsin Electric Company, Oshkosh, Wis., suffered the loss by fire of the principal part of its shop and storehouse on April 9. One of the new safety cars, one interurban car and one older double-track city car, all shop records and much valuable equipment and supplies were destroyed. The disaster came on the heels of one of the worst sleet storms in the history of Wisconsin, and was quite a blow to the company.

Despite the handicap which the fire imposed on the company the local city service and all interurban lines operated 100 per cent during the blaze and service has been maintained at that standard since then by the unceasing efforts of the manager and his staff.

The damage to the equipment is estimated at \$40,000. The stock room contained approximately \$40,000 worth of stock. It was believed at first that this stock had been entirely destroyed and that the loss would total \$100,000. Investigation made the morning after the fire indicated that this loss was not nearly so great as had appeared at first. The damage to the building is estimated at \$25,000 to \$30,000.

G-E to Equip Fifteen Trolley Buses

The General Electric Company has received an order for the electrical equipment for 15 new trackless trolley buses, eight of which will be operated by the City of New York on an extension to its system in Staten Island between Richmond and Tottenville. The remaining seven will be put on a new line that is to be built on City Island. The order was placed through the Trackless Transportation Corporation, New York, N. Y.

Decision of the city to increase its fleet of trolley buses is the result of the thorough commercial success attending the operation of the first buses which have been operating out of Meiers Corner, Staten Island, since Oct. 8, 1921. When these 15 buses are added to the system, New York City will have a total of 22 trolley buses in operation, all of which are equipped with General Electric motors and control and current collectors.

The automatic substation equipment will be furnished by the Westinghouse Electric & Manufacturing Company according to report.

Financial and Corporate

Toledo Property Reports

Deficit Under Service at Cost—Lower Fares Depend Upon Action to Regulate Buses

Operations of the Community Traction Company, Toledo, Ohio, for the eleven months of 1921 under the serve-at-cost ordinance put into effect on Feb. 1, showed a deficit of \$325,036 as reflected in the stabilizing fund. The annual report has been published by the *Toledo City Journal*, the official city publication. The passenger revenue amounted to \$2,960,966. The total gross income was \$3,148,889. Operating expenses totalled \$2,021,870.

Commissioner Wilfred E. Cann, however, points out in his report that the car riders have been saved \$327,325 by reason of the lower fares which the new plan of operation put into effect. For the first six months the fares were cut 1 cent and transfers have been cut from 10 cents to 1 cent ever since the ordinance has been in force.

From the gross revenues of the operations for 1921 there was placed in the city purchase fund \$194,792, of which \$49,000 was used on Feb. 1, 1922, to purchase 6 per cent bonds of the Community Traction Company. These, together with what may be purchased in July, will make the city's income from bonds alone about \$12,000 a month. The city fund at the present time amounts to nearly a quarter of a million dollars. During 1921 there was spent on maintenance of tracks, equipment and trolley wire the sum of \$560,188.

At the end of the year there were cash balances in the depreciation fund of \$5,789, in the reserve for injuries and damages of \$11,291, and in the reserve for taxes of \$109,913, or a total of \$126,993.

The revenue per car-mile increased from 38.045 cents in July to 46.354 in December. The high point in cost of operation per car-mile was in February with 42.863 cents, which consistently declined to 30.498 cents in December.

During February there was carried an average of 8.81 revenue passengers per car-mile. This ratio declined till the low point was reached in August with 7.1 passengers per car-mile. The December loading was at the rate of 7.95 passengers per car-mile. With a yearly average of 8.5 passengers a car-mile, Commissioner Cann declares the lines could be on a good financial basis.

An increase of less than 600,000 passengers a month will make for successful operation. Last March had 20,000 more riders than there were in December, so the possibility of wiping out the deficit appears very good.

In the report the commissioner tells the Council that it must take more drastic action to regulate the buses if

the concerted effort of all to bring lower fares is to be successful.

A comprehensive grade separation program is urged as a means of working out further economies in street railway operation. The commissioner also tells the Council that there are forty locations in Toledo where the street railways cross steam railroad tracks and 112 crossing diamonds to maintain. He says further rerouting plans will be developed during the year.

The record of the claims department was notable during 1921. For the eleven months 2,573 per cent of the gross revenue was set aside in the reserve for injuries and damages. This amounted to \$79,905. Actual settlements and operation of the department took only \$68,614, equivalent to only 2.214 per cent of the gross revenue. Better results may be attained by more careful regulation of traffic on the streets, according to the commissioner.

Of the 2,295 accidents reported by crews operating street cars, 1,323 covered collisions with automobiles, and of the 425 cases settled 143 representing collisions between cars and autos were disposed of by payment to claimants of \$9,189.

"The year 1921 ushered in a new era in local transportation in Toledo," said Mr. Cann. "Control of street railway service is now vested in the city, where it properly belongs, and your local transportation system is today, to all practical intents and purposes, solely that of the people of Toledo."

Salt Lake City Property Reports

A net revenue of \$84,815 was earned by the Bamberger Electric Railroad, Salt Lake City, Utah, during 1921, according to figures presented by the company in its annual report, which has just been filed with the State Public Utilities Commission. The operating income of the road was \$33,654, with a gross income amounting to \$48,558. From this figure the railroad claims deductions for interest, taxes, rents, etc., of \$82,213, making a deficit of \$33,655 transferred to profit and loss during the year. The principal source of revenue for the railroad was the passenger service, which yielded \$471,719, yet this was \$79,067 lower than the 1920 passenger revenue.

The railroad claims investments to a total of \$3,910,442, this being an increase over the preceding year of \$102,448. Par value of the capital stock Dec. 31, 1921, aggregated \$1,500,000. The average investment per mile of road was \$102,676, the total investment in road and equipment being \$3,690,188. The book value of investment in the Lagoon resort and the Salt Lake Terminal Company is given by the company at \$147,652.

To Take New York Depositions

Minneapolis Valuation Hinges on City's Access to Books—Hearing Set for April 25

Neil M. Cronin, city attorney of Minneapolis, Minn., is in New York to take depositions of four witnesses in the mandamus action against the Twin City Rapid Transit Company and allied corporations to get access to minute books and other records. Depositions were begun on April 11 before William Bradford, notary public. The city desires to ascertain the true valuation of the company's property.

The writ was signed on Feb. 9 by Judge W. W. Bardwell of the District Court, the city seeking to compel the traction officials to produce the books to aid in the appraisal being made by Delos F. Wilcox for the city in its rate litigation. The City Council had directed the company to give Dr. Wilcox access to the books, which the company is alleged to have refused to do, with the exception of the minute books of the Minneapolis Street Railway and other associated companies. Delay of twenty days to March 2 was granted on motion of the company, its plea being it would be necessary to go to New Jersey to get the books. Secretary A. M. Robertson said the Twin City Rapid Transit Company is merely a holding company and that its books have no records of the business activities of the Minneapolis company. The writ was dismissed on March 13 on motion of the city attorney and a new action begun before Judge H. D. Dickinson, who granted a writ directed against the Twin City Rapid Transit Company and the St. Paul City Railway, omitted in the first order. The New Jersey company's answer stated that that company has not been the fiscal agent of either Twin City company since 1907 and that the Transit Supply Company is the fiscal agent and its books are open. In reply to an allegation of the city that the Twin City Rapid Transit Company had arbitrarily caused substantial amounts to be paid the St. Paul City Railway on which the railway is not required to pay interest to the Minneapolis Street Railway, from which the amounts are taken, it denies that the St. Paul and Minneapolis companies are caused to assume a joint fund obligation. The two local companies executed a joint mortgage securing \$10,000,000 of bonds guaranteed by the Twin City Rapid Transit Company.

Upon filing of this answer of the company on April 2 the hearing was set for April 25. This being the date set for the valuation hearing of the St. Paul City Railway before the Railroad and Warehouse Commission, St. Paul considers advancing the date so as to have a joint hearing with Minneapolis, giving the latter city no advantage over St. Paul in its proceedings to determine the basis for a true fare decision by the state commission.

Surplus of \$990,099

Virginia Property Cuts Operating Expenses—Cash Conserved for Improvements—Traffic Decreases

After deducting all charges the Virginia Railway & Power Company, Richmond, Va., realized a surplus of \$990,099 for the year ended Dec. 31, 1921. Adding the surplus at the end of 1920 the total surplus as of Dec. 31, 1921, is \$2,291,175. From this amount a deduction of \$507,738 was made for dividends on preferred stock and an accumulated surplus remains on Dec. 31, 1921 of \$1,783,437.

Gross earnings for the year amounted to \$10,173,335, an increase of \$179,759 over the year 1920. Operating expenses decreased from \$7,080,070 to \$7,067,662.

The annual report of the company shows that the property of all departments is in good physical condition. Improvement in operation is also seen from the fact that expenditures for maintenance and way and equipment amounted to \$1,060,593, against \$1,179,781 in 1920. In addition to the regular charges for maintenance of way and equipment an amount of \$610,400, equal to 6 per cent of the gross earnings for the fiscal year, was included in the operating expenses and credited to reserve for depreciation, thus continuing the policy followed by the company during the last ten years. The balance to the credit of reserve for depreciation on Dec. 31, 1921, was \$1,625,811.

The total number of passengers carried during 1921 was 105,192,532, against 113,615,675 in 1920.

In his report President Wheelwright said that on account of the necessity of making extensions and improvements in both railway and light and power departments the board of directors considered it necessary to continue the conservation of cash resources of the company so far as possible and for that reason no cash dividends were declared on the stock of the company during the year. He said further that the board of directors in its desire to deal fairly with the holders of its non-cumulative preferred stock declared a dividend of 6 per cent on preferred stock, payable in preferred stock for the year 1920, and a similar dividend for the year 1921.

Greater Volume of Business Under Negotiation

The annual report of J. G. White Companies, New York, N. Y. for the year ended Dec. 31, 1921, shows a deficit of \$126,484, against a surplus in 1920 of \$313,016. The total assets and liabilities as of Dec. 31, 1921, are \$6,698,527.

The report states that as predicted in the previous annual report the business of the Engineering Corporation was adversely affected by the general business depression. It goes on to say further that since the first of the year

a substantial amount of satisfactory business has been secured. Further improvement in this respect is anticipated as more new business is under negotiation than at any previous time for several years.

Will Vote on \$300,000 Bond Issue

St. Petersburg (Fla.), will vote May 13 on a \$300,000 bond issue to provide an electric plant to run its municipal electric railway and furnish power for waterworks, gas plant and street lighting.

The city attorney has been ordered to draw the ordinance and the commission will pass it and immediately call the election.

C. T. Baker, a consulting engineer, has submitted a comprehensive report covering the cost of installing and operating an electric power plant in St. Petersburg, using Diesel type engines. He suggests that the plant be located on Second Avenue south about Eighteenth Street, on the Seaboard Airline Railway. He estimates that the plant complete will cost \$301,000 and that the cost of the first year's operation, including fixed charges, will be approximately \$61,350, while Director of Utilities R. E. Ludwig estimates that under the latest proposed contract with the St. Petersburg Lighting Company the cost for power the first year would be \$65,000 and the city would be obligated to pay for certain improvements at the privately owned plant. The estimated cost of the city plant the second year is \$68,470, while Mr. Ludwig estimates the cost to the city for that same year, under a contract with the lighting company, at \$112,340.

Meeting Held—Will Absorb West End Property

The Boston (Mass.) Elevated Railway's stockholders held their annual meeting on April 3 and re-elected the old board of directors. They did not fill the vacancy on the board caused by the recent death of General William A. Bancroft.

On June 10 the Boston Elevated will absorb the West End Street Railway, which it has been holding under a lease, and the West End company will pass out of existence. The West End preferred stock will be exchanged for Elevated first preferred; the West End common will become Elevated second preferred stock and the Elevated preferred stock will become Elevated third preferred rates of dividend to remain as they are today on the respective stocks.

The West End Street Railway is the owner of the surface lines in the Elevated system. When it passes out of existence some of its directors and officers may be taken into the Boston Elevated directorate, as under the law the seven directors who were elected by the elevated stockholders on April 3 have a right to increase their number to fourteen.

Protective Committee Makes Favorable Report

In the letter sent to the noteholder by the protective committee it was said that the net earnings of the Brooklyn Rapid Transit Company subway and elevated lines for the eight months ended Feb. 28, 1922, were \$2,378,600. This sum is in excess of operating expenses and taxes, interest on the \$22,967,000 of underlying bonds resting on the elevated lines and on the receiver's certificates and other prior charges. The showing thus made is at the rate of about 5.9 per cent per annum upon the outstanding notes and bonds of these issues, and if allowance be made for \$298,606 of interest on receiver's certificates reported to be chargeable to construction this rate would be increased to about 6.7 per cent. The letter states further that the receiver of the subway and elevated lines has been able to pay off \$2,000,000 of the \$18,000,000 of receiver's certificates that were originally issued, and an additional \$2,500,000 have been purchased by the receiver of the Brooklyn Rapid Transit Company out of funds in his hands. In part the letter says:

Your committee will continue to press for the necessary adjudication and to keep in touch with the further proceedings of the Transit Commission and with the operation and earnings of the properties, to the end that unless the Transit Commission should offer some basis for participation in a comprehensive plan of reorganization which the security holders can afford to accept, the committee may be in a position to proceed with the formulation of a plan of reorganization as soon as the necessary legal questions have been finally adjudicated and conditions are opportune for the raising of the money necessary to provide for the payment of the receiver's certificates and other cash requirements.

It is said that meetings have been held for some time with the object in view of effecting a reorganization of the property. Officials of the company stated that within a few months an application to lift the receivership might be made.

Judge Julius M. Mayer in the Federal District Court has signed an order directing the receiver, Lindley M. Garrison, to pay on April 15 the semi-annual coupon interest due since July 1919, on the first consolidated mortgage 4 per cent gold bonds of the Consolidated Island & Brooklyn Railroad Company and on the 5 per cent consolidated first mortgage bonds of the Brooklyn City & Newton Railroad. The interest to be paid at 6 per cent from the time that payment was originally due.

Seeks Bond Extension.—The Worcester Consolidated Street Railway, Worcester, Mass., has filed a petition with the Department of Public Utilities asking approval of an extension of \$500,000 of 4½ per cent gold coupon bonds for five years from Sept. 1, 1922. These bonds are part of an issue of \$2,000,000, \$500,000 of which are dated Sept. 1, 1902, and the remainder dated Sept. 1, 1905. The new bonds, if approved by the commission, will be interest at 7 per cent.

Application May Be Withdrawn

Threatened Abandonment of the Springfield and Washington Line May Result in Complete Reorganization

Although application has been filed with the Ohio Public Utilities Commission for abandonment of service on the Springfield & Washington Railway, operating between Springfield and South Charleston, Ohio, with hearing set for April 14, developments indicate that the application will be withdrawn and service continued under a complete reorganization program. G. D. Baker of Springfield, son of G. W. Baker, the original owner of the line, has purchased the interests of the other heirs and announces that service will continue with a number of changes to be inaugurated. Under the reorganization now being arranged, Mr. Baker becomes president and treasurer; W. W. Keifer, Springfield, vice-president; E. W. Gangwish, Washington Courthouse, secretary; James McDaniel, Washington Courthouse, general manager, and C. J. Baugh, South Charleston, assistant general manager.

One of the first efforts of the reorganized company will be to regain the extensive freight business lost when shippers began delivering their products by motor truck. Mr. Baker declares that under a plan he has in mind he can deliver these shipments quicker and cheaper than the manufacturers can with their own trucks where they have less than a full truck load for transportation both ways. He is at present engaged in perfecting this plan and says he will make a public announcement of it within the near future.

Since the sale of the road an arrangement has been made with the Flag motor-bus line of Washington Courthouse, which has been operating buses between Springfield and Washington Courthouse and other points, whereby the bus line will operate between South Charleston, discontinuing service to Springfield. Transfers between the bus line and the traction line will be issued for persons desiring to make the through trip. Package freight between the two points will be handled in this manner also.

Mr. Baker has received the assurances of the Springfield and South Charleston Chambers of Commerce that these bodies will offer co-operation in every way possible, and already a campaign has been started for the members to make their freight shipments via the traction line. Passenger service will stop at 9 p.m. daily and freight only will be handled between that hour and 5 a.m. It is planned to make a special rate for all night freight shipments.

One of the problems which has faced the road was that of taking care of its paving assessments. In this respect, however, the Springfield Chamber of Commerce has offered its aid and an effort will be made to have the traction

line exempted from any paving assessments now due or which may be levied in the future. Should this move be found impossible, the business men may propose an extra levy which it is believed will carry, inasmuch as all persons living along the line are anxious to make some sacrifice in order to keep the road in operation.

Power for the road is now being obtained from Dayton, but it is understood that the Springfield Light, Heat & Power Company will provide a contract at a much lower figure than is now being given. Attempts will also be made to operate "feeder" bus lines along the way, running from cities or towns not connected with the traction line, to a point where contact can be made with the line and transfers made. A test bus will be operated at various points to determine how practical this proposal will be.

Other traction lines in the vicinity are watching the Springfield & Washington Railway developments with keen interest inasmuch as this was one of the first roads to feel the real effect of motor bus and truck competition. It is felt that should a practical solution of the road's problems be reached so as to make it a financial success, the ideas will be worth application to other lines.

Financial News Notes

Carhouse Sale Postponed.—The sale of the carhouse property of the New York Railways at Thirty-second Street and Lexington Avenue has been adjourned until April 20. It was originally scheduled for March 30 on the steps of the New York County Court House.

Applies for Stock Sale Permission.—The Chicago, Aurora & Elgin Railroad has applied to the Illinois Commerce Commission for permission to issue \$11,000,000 common stock for the purpose of acquiring the properties of the Aurora, Elgin & Chicago Railroad, Aurora, Ill.

Year's Surplus Is \$113,550.—The Michigan Gas & Electric Company, Ishpeming, Mich., reports for the year ended Dec. 31, 1921, gross earnings of \$553,957; net earnings of \$119,055; surplus after interest and other charges of \$19,758, leaving a total surplus on Dec. 31 last of \$113,550, as compared with \$118,863 on Dec. 31, 1920.

Will Offer Securities.—The Wisconsin Railroad Commission has granted permission to the Wisconsin Gas & Electric Company, Milwaukee, Wis., to issue \$750,000 in securities to pay for additions to power house equipment and for extensions to its lines. This company sells gas and electricity in southern and eastern Wisconsin.

Surplus of \$487,521.—For the nine months period ended Dec. 31 1921, the Market Street Railway, San Francisco, Cal., realized a surplus after interest charges, etc., of \$487,521. The total revenues were \$7,089,944 and the gross income was \$1,439,466. Total assets and liabilities as of Dec. 31 amounted to \$48,696,411.

New Issue Announced.—Harris, Forbes & Company, New York, N. Y., are offering \$3,000,000 of the New York State Railways first consolidated mortgage gold bonds. The bonds are dated Nov. 1, 1912, and are due Nov. 1, 1962. They are 4½ per cent securities with 2 per cent extra coupons, thus bearing 6½ per cent interest. The offering price was 95 and interest, to yield about 6½ per cent.

Receiver Will Purchase Coupons.—The Nassau Electric Railroad of the Brooklyn (N. Y.) Rapid Transit Company, through its receiver, has announced that it will purchase all matured coupons from the general consolidated mortgage bonds of the Atlantic Avenue Railroad. The Metropolitan Trust Company will handle the coupons. The amount of bonds outstanding of this issue is \$2,241,000 on which the Oct. 1, 1919, and subsequent coupons were in default. The Oct. 1, 1919, coupons down to the April 1, 1922, inclusive are being purchased by the trust company.

Denies \$325,000 Debt to Doherty Company.—Bondholders of the Toledo & Western Railroad, represented by Samuel Dority, Toledo, have filed a motion in Federal Court asking leave to file an intervening petition in the suit of Henry L. Doherty and Frank W. Frueauff, of Henry L. Doherty & Company, against the Toledo & Western Railroad. Dority denies that the defendant company is indebted to the Doherty interests in the amount of \$325,000 as claimed or to the Toledo Railways & Light Company in the amount of \$175,675, and asserts that Doherty and a number of other individuals interested in the company are really indebted to the company through their liability as stockholders of the company.

Abandons Part of Line.—The Lafayette (Ind.) Street Railway, Inc., has announced the discontinuance of service on the Lafayette-Battle Ground line beyond the Tecumseh Trail and the Soldiers' Home. The track beyond Tecumseh Trail belongs to the Indiana Service Corporation, and according to Allison E. Stuart, counsel for the Lafayette Street Railway, is not sound enough to be used. The Lafayette Service Company, which the Lafayette Street Railway succeeds, operated over the track, agreeing to care for the track and roadbed. The former company has not the money to make the repairs and the new company does not feel that it can make the necessary changes. The agreement between the two companies was verbal.

Traffic and Transportation

Agreement in Spokane

After Many Months of Controversy
Railway Wins Over Jitney—
People Will Decide Issue

A final agreement has been reached between the Mayor and City Council of Spokane and the street railway officials of the city which terminates the warfare between the two bodies, waged bitterly for the last year, over the advent of jitneys in competition last June. Conferences looking to this settlement have been held during the past several weeks with each day's outcome not infrequently contradicting that of the day preceding. Several times it appeared that there was no hope of getting together.

CITY AND RAILWAY OFFICIALS AGREE

As the situation stands, the city officials and those of the two street railway systems, the Spokane & Eastern Railway & Power Company and the Washington Water Power Company, which are to be consolidated under one head, are in accord. It remains now for the people of Spokane to set their seal of approval upon the agreement by voting certain city charter amendments at a special election to be held on May 2. The entire article in the charter relating to franchise is to be placed on the ballot in its proposed revised form for the convenience of the voters so that there will not be the confusion which might result from the voting on the change by sections.

The jitneys, of which there are more than sixty in operation, are not to be relicensed Jan. 1 of next year. In return the railways concede a 6-cent fare by ticket and a 7-cent cash fare to the casual passenger, with universal transfer, and a 4-cent fare for school children. This agreement effective July 1 is for three years.

In the charter amendments that have to be voted upon, it is agreed that the companies may discontinue service upon a year's notice if jitney competition is renewed at any time. It is prohibited from discontinuing service upon any one part of its system in advance of the termination of the franchise for the entire system. The sprinkling of tracks on graded streets by the company is to be continued, although this was one of the burdens which the street car men asked that they be freed from.

Free rides for mail carriers are to be dispensed with, though this does not amount to anything as the section relative to this in the present franchise has been a dead letter and the government has paid for the carriers. Provision is made that all lines must have owl car service and it is probable that metal tokens will be used for the regular patrons rather than selling tickets to them. There is little question

but that the people of the city are well pleased to have the controversy settled on so favorable a basis and that they will voice this at the election.

The prevailing rate of fare has been 8 cents on the street cars, with jitneys running with a 5-cent fare. Early last year the State Public Service Commission, after having had the question under consideration for some months and having held a public hearing at which the city officials bitterly opposed such increase, granted the Washington Water Power Company and the Spokane & Eastern Railway & Power Company the right to increase their fares from 6 cents to 8 cents. Mayor Fleming at the time of the hearing announced that the putting into effect of an 8-cent fare would mean the letting loose of jitney competition. He reiterated this upon the announcement of the decision by the commission, which in such decision took occasion to state that it hoped he had not made such statement in earnest and to point out the disastrous effect of such action upon the transportation situation. A committee of influential citizens sought to act as intermediaries among the companies and the Mayor and Council.

MAYOR CARRIES OUT THREAT

A compromise offer of a 7-cent fare was secured by the committee and laid before the Council, which rejected it for the reason, so the members explained, that it was not authoritative and that the 7-cent fare was for tickets, while the legal fare remained at 8 cents. The net result was that the 8-cent fare was put in operation early in June last year and the Mayor immediately took steps to carry out his threats. Shortly nondescript vehicles began to make their appearance on the street. These were succeeded as the weeks passed by better and more commodious vehicles and more of them.

The competition began to be felt more and more by the companies, with the result apparent in a gradual lessening of the frequency of service on practically all lines, the discontinuance of several and the laying off of considerable numbers of railway employees. Reports by jitneys to the city hall indicate that they carried in the peak months approximately 30,000 daily fares. The average street car business previously ran 70,000 fares, so the jitney competition cut the street car patronage almost in half. It is estimated that the fight has cost the traction people about a half million dollars, while the taxpayers of the city have also been called upon to pay costs in maintaining streets for jitney service, some additional paving authorized for them and much more on the wear and tear on paved streets, the latter an item that cannot be determined.

Submits Rate Exhibit

Railroad Commission States Electric
Fares in California Are Lowest
in United States

In connection with the rehearing of the Hollywood rate case regarding increase of fares on Pacific Electric line the California State Railroad Commission has, after the close of the rehearing, submitted to the various communities opposing the fare increases a comparative rate exhibit. The details of the rehearing were given in the ELECTRIC RAILWAY JOURNAL, issue of April 8.

The commission says that the fares in California cities are virtually, without exception, the lowest in the United States. The exhibit was compiled by the engineering department of the commission from information received in response to a questionnaire sent to 100 of the principal electric railways in America and constitutes the latest official compilation on the subject. The report is compiled as of Jan. 1, 1922. The questionnaire requested information as to the present rates of fare, reduced-rate tickets, transfer privileges, length of ride possible and other more technical information.

Referring to the California fares the report says that with few exceptions, railway fares in California cities were either 5 or 6 cents. It was to be noted that in the cities of Pomona, Redlands, Riverside and Santa Cruz, with a 10-cent cash fare, and Santa Barbara with an 8-cent cash fare, an endeavor has been made to enable the continued operation of street railway service by increasing fares approximately to their economic maximum. These communities were faced with the possibility of abandonment of service on account of operating losses due to automobile competition and other causes and the present fares may be considered somewhat in the nature of an experiment. In all cases in California where a 10-cent cash fare obtained it was a question either of discontinuing service entirely or collecting the maximum fare, and the cities chose the latter alternative.

Data were collected for the compilation from seventy-nine cities. From this number twelve cities have a 10-cent fare, one a 9-cent fare, fifteen an 8-cent fare, thirty a 7-cent fare, twelve a 6-cent fare and nine a 5-cent fare. Most of the cities reporting, especially those having the higher cash fares, allow a discount on the purchase of tickets or tokens in quantity. In a number of cases an additional charge is made for transfers.

The report also gave consideration to the maximum length of ride and said that on a unit fare it varied according to the different cities from approximately 2 miles in smaller towns to a maximum of 34 miles in Chicago.

In Los Angeles the average length of ride on the Pacific Electric lines performing local service is found to be 5 miles.

Six-Cent Fare Ordered in Chicago

New Surface Lines' Rate to Go Into Effect May 1—Rate Justified by Eliminating Several Obligations Specified in 1907 Franchise Ordinances

BEGINNING May 1 the rate of fare on the Chicago Surface Lines will be 6 cents if the order of the Illinois Commerce Commission entered April 8 is carried out. The new order is "tentative, temporary and experimental" and is to be effective until Jan. 1 unless changed in the meantime. The commission expresses the belief that the 5-cent fare order which was enjoined by the federal court last November could have been made effective if there had been co-operation between the companies, their employees and the city. The companies have been collecting an 8-cent fare since July, 1920. The new order rescinds and annuls the 5-cent fare order of Nov. 23, 1921, and it is expected that steps will be taken to dismiss the proceedings in the United States court where a master in chancery was about to begin taking evidence for the purpose of deciding whether the injunction should be made permanent.

WILL LIKELY ASK FOR REHEARING

By this latest order the companies' return is limited to 5 per cent. Under the order of the previous commission the rate of return was fixed at 7½ per cent, although the companies last year turned only 6½ per cent on the allowed valuation. It is understood that the companies regard the 6-cent order as confiscatory. No announcement was made as to what steps they would take, but it is likely they will ask for a rehearing and the commission will be allowed twenty days under the law to decide this question. That could be settled before the date on which the order is supposed to become effective. Last year the gross income of the surface lines was \$60,343,733 and the expense, including taxes, was \$46,965,511. The commission figures that the reduced fare will attract about 50,000,000 additional revenue passengers, so that the gross earnings will be \$7,916,228. Last year the companies had 12.78 per cent of the gross for maintenance and 8 per cent for renewals. It is proposed to combine these two accounts and allow a total of 16 per cent, which would save \$759,187. This is practicable, it is claimed, because there is no deferred maintenance and the property is in a condition of good operating efficiency. The companies last year carried to the injuries and damages fund \$2,301,244, and actually spent \$1,762,778 from this amount. The damage reserve fund is now \$2,490,359. The commission does not believe that a fund of this character should be accumulated and proposes to cut the allowance to the extent of \$1,001,224 during this year. It is also proposed to save \$700,000 in the allowance for materials on the theory that prices have gone down 20

per cent below the average last year. An interesting feature of the decision is the disallowance of any appropriation for sweeping, cleaning and sprinkling streets, thereby saving \$607,000 per year. On this point the commission says:

Whatever may be the relations between respondent companies and the city of Chicago, any obligation which may be in the license contracts of said city requiring respondent companies to pay certain portions of the cost of sweeping, cleaning and sprinkling the streets is not binding upon this commission in the exercise of the police power of the State in the fixing of rates of fare to be charged and collected in the city of Chicago, and is not a proper charge to operating expenses of said companies.

PROPOSED SAVINGS TOTAL MILLIONS

Summarizing the savings proposed by the commission, it is found that these total \$7,079,411 from operation and \$2,403,131 from the allowed rate of return. By inference the city will also lose its share of receipts because there would be no surplus to divide. This would save another \$2,944,963. These savings would total \$12,427,505, and on this basis the commission figures that the total expense will be \$39,885,000. Deducting this from the estimated gross of \$47,916,000, the net return of approximately \$8,000,000, or 5 per cent on the former commission's value of \$160,000,000, is arrived at.

The commission agreed with the companies' estimate that taxes would again increase this year in spite of a 46 per cent increase last year and it allowed \$407,000 additional for this item. It announced that further attention will be given to the valuation of the properties and for the present it would not disturb the previously allowed figure of \$160,609,761. On the question of return, it said the evidence showed that interest rates have decreased 1½ per cent from peak costs and, therefore, 5 per cent would be a reasonable allowance.

On the question of high wages the order reads:

This commission has been criticised for not ordering an immediate reduction in operating expenses of respondent companies, especially in regard to salaries and wages. Under the Illinois commerce act, this commission has no authority to make such a direct order. Where, however, it is perfectly apparent, as it is in this case, that the operating costs of a company are excessive in proper relation to the cost of labor and industries requiring similar skill, to the prices paid for the same service by similar utilities in other cities of the United States, this commission believes that not all of this excess cost should be reflected in the rates of fare charged and collected, but that a certain portion thereof should be borne by the company itself.

The maximum wage for trainmen in Chicago is 80 cents an hour and the commission points out that when this rate was fixed in 1920 the cost of living in Chicago was about 114 per cent over that of December, 1914. In December, 1921, the order says, this had receded to a point where it was 72.3 per cent over the 1914 level, when the men were

receiving 32 cents an hour. Exhibits in the case showed further that the maximum wage for trainmen in a number of large cities had dropped from an average of 61.1 cents in 1920 to an average of 54.9 cents, a decrease of 10.1 per cent from the peak. Evidence showed also that from 1914 to 1918 the Chicago wage was 4.6 cents an hour higher than other properties and on this basis it would now be 60.3 in Chicago. To get to this level, it is pointed out, there would have to be a reduction of 24.6 per cent. It was stated during the hearings that the companies were negotiating with the men for a reduction in wages at the time the fare fight was renewed. The contract since that time has been continued on a month to month basis.

Big Issue Before New Council

The fare proposition in Madison, Wis., looms up as a big issue before the newly-elected City Council. The Madison Railways Company has submitted a schedule of fares which has the indorsement of the City Attorney and Mayor. It includes a 10-cent cash fare, 3-cent fare for children, seven tokens for 50 cents and books containing thirty tickets for \$1.50. The company agrees to this rate if the city relieves the company from all obligations to surface the railway zones in certain streets. This work has been held up pending an agreement with the company. Just what action will be taken if the city fails to approve of this action street railway officials decline to say. It is expected, however, that the new Council will take favorable, or at least some definite action within six weeks.

Recommends Increased Railway Service

Glendale's proposal to operate a municipal bus line in Los Angeles, Cal., was rejected recently by the Los Angeles Board of Public Utilities. In rejecting the request, the board considered the reports of its chief engineer, H. Z. Osborne, Jr., and also briefs submitted by the Pacific Electric lines and the city of Glendale. Recommendation that the Pacific Electric increase its service on its Glendale line during the morning and evening rush hours was also voiced by the board. D. W. Pontius, vice-president and general manager of the company, stated that the railway would gladly comply with the recommendations. Commissioner Leeds of the board, in explaining his negative vote, said he believed that the paralleling of the Pacific Electric Railway line with a bus line for the entire distance was unfair competition. Commissioner Kennedy stated among other things that he did not think that this was any time to cripple any public utility, whether privately or publicly operated. Details of this municipal bus project will be given in BUS TRANSPORTATION for May.

One Dollar Weekly Pass for Terre Haute, Too

The Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., has made application this week to the Public Service Commission of Indiana for permission to install on the 5-cent city cars of Terre Haute the unlimited-ride transferable weekly pass to be sold at \$1. This will make the sixth property in the United States and the second in Indiana to use this form of transportation, the first five properties being Racine, Kenosha, Youngstown, Beaver Valley and Fort Wayne.

To prepare the carmen and the public for this innovation, E. M. Walker, general manager, invited Walter Jackson, originator of the pass, to aid in the publicity campaign. Mr. Jackson called on both the leading merchants and theater managers of the city to secure their help in pushing the pass as a producer of the off-peak travel that means so much to them. He also addressed the night and day carmen, explaining the meaning of the pass from both the fare-handling and business-building standpoints.

Mr. Walker's suggestion that they be placed on a commission basis met such a cordial response that a number of operators said they would do more than sell passes on the card—they would offer them to their neighbors in their off hours.

The local papers which were represented at these meetings have published good accounts of the pass, so that the pass is already a matter of general knowledge, even in advance of the advertising campaign prepared for newspaper and car window use. The company hopes to put on pass No. 1 for the week beginning May 1.

Boise Revenue Gains in Second Week

The second week of the 7-cent cash fare on the Boise (Idaho) Street Car Company and the Boise Valley Traction Company shows an increase in passengers and revenue over the first week of the new rates. The first week showed a falling off in traffic and receipts as compared with the last week of the lower fares. During the second week the Boise Street Car Company carried 698 more passengers than during the first week, and collected \$30 more in fares. As compared with the corresponding weeks in February, the first week of the new rates showed a decrease of \$106 on the Tenth and Eighteenth Street belt lines of the Boise Valley Traction Company in revenue and of 3,705 in passenger traffic, while the second week showed a revenue decrease of \$61.79 and passenger decrease of 2,668. The South Boise line during the first week of the new fares reported a decrease, as compared with the last week of the old schedule, of \$27 in revenue and 686 in passengers. For the second week it reported an increase of thirty-eight in passenger traffic and \$9.08 in revenue

over the corresponding week in February. The announcement of new rates was given in the *ELECTRIC RAILWAY JOURNAL*, issue of April 8.

Fare Increase Sought in Mobile

The Alabama Public Service Commission has under advisement a petition of the Mobile Light & Railroad Company for an increase in fares. The company has requested the right to charge an 8-cent cash fare instead of the present 7-cent one and an increase in the ticket rate from 6 to 7 cents. At present four tickets are sold for 24 cents.

Opposition to the proposed increase was registered with the commission by the city of Mobile. A request was made that the old contract rate of 5 cents be re-established. This contract was suspended as an emergency measure about two years ago to permit the company to charge the present rates, to meet the increased costs to which it was then subjected. The Mobile Light & Railroad Company now contends that not only have costs failed to be reduced, but that losses in traffic and the suspension of shipbuilding activity at the Chickasaw plant have created losses in revenue which if continued throughout the present year will cause a deficit of \$162,700.

The commission has determined to have a valuation of the property made before rendering a final decision on rates. The commission's own engineers will value the property. The company has already had a valuation made on its own account. According to report, this valuation showed that the property had cost a minimum of \$4,050,000, and that it would now cost \$6,506,000 to reproduce.

One of the appraisals of the properties of the Mobile Light & Railroad Company is being made by the firm of Harry Barker & Robert C. Wheeler of New York City and Albany, N. Y., working in connection with Capt. Charles T. Long, the company valuation engineer. The field work is being done by a force of about fifteen under the direction of Capt. Harry Barker, who will present the results before the Alabama Public Service Commission. The commission engineer, L. M. McDonnell, is making a concurrent check and appraisal.

Railway Loses Fare Suit

In an opinion by Justice Brandeis the United States Supreme Court recently decided against the Galveston (Tex.) Electric Company in its suit to enjoin the city of Galveston from putting into effect a 5-cent car fare. The company contended that this rate was confiscatory. The District Court for the Southern District of Texas denied the injunction on the ground that it had no right to interfere with the fixing of rates, which was a legislative function, unless it appeared beyond doubt that the rates would deny just compensation, which it was not convinced was shown in this case.

Transportation News Notes

Children's Fares to Be Reduced.—Officials of the Pine Bluff (Ark.) Company have announced that they are working on a plan for reduction of the fares charged school children. A reduction to 3 cents has been asked, and the officials state that it is probable that a reduction to less than 3 cents will be made.

Freight Rates Reduced 16 and 20 per cent.—Freight reductions of 16 and 20 per cent, effective April 10, have been announced for the electric lines of the Cleveland, Southwestern & Columbus Railway, Columbus, Ohio. This will make the rates equal to those prevailing on steam roads. E. L. Hukill also announced a similar reduction for the Columbus, Delaware & Marion Electric Company, effective April 20.

Reduced Rates Announced.—The Western Light & Power Company, Boulder, Col., through its general manager recently announced a reduction in railway fares approximating 20 per cent. This step was voluntary on the part of the company to induce more people to ride. Single rides will be 1 cent, the present rate; strips of seven tickets can be bought for 50 cents and books of twenty rides will be sold for \$1.25 instead of \$1.50.

Seek Lower Rates.—Six separate petitions have been presented to the City Council of Fort Smith, Ark., by 37 citizens of that city asking that the Council order the Fort Smith Light & Traction Company to reduce its trolley fares from 7 to 5 cents. The petition call for transfers and half fares for children. The Council has set April 1 as the date for a hearing. It is said that the petitions were circulated shortly after the platform men employed by the traction company accepted a cut in wages of 6 cents an hour. The negotiations lasted for five weeks, ending with the men signing the only contract offered by the company.

Fares Reduced on Grays Harbor Lines.—A fare reduction from three tickets to four tickets for 25 cents has been ordered by the Department of Public Works of Washington, on all lines of the Grays Harbor Railway Light & Power Company. This railway serves Hoquiam, Aberdeen and Cosmopolis. The reduction is for an indefinite trial period. Cash fares continue at 10 cents. The reduced rate is effective April 30. Trial of 10-cent cash fare and three tokens for 25 cents resulted in a loss to the company, but with the lower fare the company hopes that increased patronage, particularly in intercity traffic, will more than make up for the reduction. One-man cars and other operating economies have been instituted by the company. This matter has been referred to previously.

New Publications

Fire Tests of Building Columns

By the Associated Factory Mutual Fire Insurance Companies, the National Board of Fire Underwriters and the Bureau of Standards. 389 pages, illustrated.

This bulletin reports the results of an experimental investigation of the resistance of building materials and loaded columns when exposed to fire to fire and water, with the record characteristic effects.

Bibliography of Petroleum and Allied Substances (1918)

By E. H. Burroughs. Bulletin No. 189. United States Bureau of Mines, Washington, D. C.

This bulletin contains a complete list of all material appearing in periodicals during 1918 on the subject of petroleum. The references are classified according to the Dewey system and a short résumé of each article is given.

Motor Truck Transportation

By F. Van Z. Lane. Published by D. Van Nostrand Company, 8 Warren Street, New York.

This book is a summary of the principles governing the success of motor truck transportation, practically all the space being devoted to freight carrying vehicles. Operating costs, motor truck vs. other modes of transportation, and other load carrying equipment, are all discussed in a general way. The author is the lecturer on motor truck transportation at New York University.

Signaling on the Berlin Elevated and Underground Railways

Published by Julius Springer, Berlin, Germany. 188 pages; illustrated.

This gives a very complete description of the types of signals and signal equipment together with methods of installation with circuit diagrams for the Berlin (Germany) Elevated & Underground Railways; also similar information for the London Underground and New York subways. It puts in permanent form information not available elsewhere.

Railway Statistics of the United States for 1920

By Slason Thompson, Bureau of Railway Laws and Statistics, Chicago, Ill.

This is the eighteenth year that Mr. Thompson has published his little book of statistics of the railroads in this country and abroad. The data relate not only to rolling stock, mileage and finances for both American and foreign roads but to many allied topics. The book contains 147 pages and will be found very useful for any one looking for group statistics of the steam railroads. Many of these are in comparative form. Editorial comments accompany many of the figures given.

American Electricians' Handbook

By Terrell Croft, consulting engineer. Second Edition. Published by McGraw-Hill Book Company, Inc., New York. Cloth 7 x 4 1/2 in. 789 pages. 900 illustrations.

A second edition of American Electricians' Handbook, by Terrell Croft, has been published by the McGraw-Hill Book Company, Inc. This popular handbook has been found very useful by practical electricians, and is particularly noted for its clear explanations and good illustrations.

Effect of Moisture Content on Concrete

A Study of the Effect of Moisture Content Upon the Expansion and Contraction of Plain and Reinforced Concrete. By Torata Matsumoto. Bulletin No. 126 of the Engineering Experiment Station, University of Illinois, Urbana. Sent upon request.

This study contains some of the results of experiments made by the author, who did graduate work in Theoretical and Applied Mechanics at the University of Illinois in 1918. He was for many years an engineer on harbor work in Formosa and wished to determine the lasting qualities of concrete in a damp and tropical climate.

Sistema de Alimentazione Della Linea a Trazione Elettrica a Corrente Continua

By Enrico Sorelli, Brescia. 46 pages, paper.

This pamphlet describes the transmission system for direct current electric railways devised by Mr. Sorelli, an Italian engineer. The purpose of this system is to reduce the number of converting substations and centralize the distribution of energy by the use of a system of double feeders at different voltages. He states that by the use of his system the tension is equalized throughout the line and that the drop is reduced to very small fraction.

The most interesting feature of the booklet is a technical description of conditions on the Gardone-Travernole electric railway where his system is in use.

Federal Power Commission Report

Government Printing Office, Washington, D. C., 1921

The first annual report of the Federal Power Commission, which covers the fiscal year ended June 30, 1921, has been published. The report states that the commission's jurisdiction is limited to the consideration of projects designed to produce water power; further, that the body has the authority to grant permits or licenses for constructing, maintaining and operating which have previously been approved by the International Joint Commission. On Nov. 1 the commission had received 260 applications which aggregated 11,060,000 primary horsepower and 16,826,000 hp. of estimated installation. The applications affected thirty-three states, the District of Columbia and the territory of Alaska. This estimated installation is approximately twice the horsepower so far developed in the United States.

The Federal Power Commission consists of the Secretaries of War, the Interior and Agriculture, and O. C. Merrill, who is executive secretary.

Legal Notes

CALIFORNIA—Ejectment not Proximate Cause of Injuries Sustained More than 1/4 Mile from Place of Ejectment.

A railroad was not liable for injuries to person on the track on the theory that it had negligently ejected him for failure to produce a ticket or fare, though he was in a helpless condition as a result of intoxication or other causes, where injuries were sustained three-fourths of a mile from the place of the ejectment, the ejectment in such case is not the proximate cause of the injuries. [Lammers vs. Pacific Electric Ry., 199 Pacific Rep. 523.]

FEDERAL COURTS—Payment of Interest into Special Fund Held to be a Contract Requirement.

Where a city, in an ordinance authorizing the issuance of bonds, irrevocably obligated itself to pay into a special fund from the gross revenues of its street railway system before each installment of interest falls due a sum equal thereto, and requiring the city treasurer one month prior to this interest date to set aside the amount thereof, the provision for setting the interest aside is part of the contract obligation binding on the city and not merely a directory provision. [Puget Sound Power & Light Co. vs. City of Seattle et al., 271 Federal Rep. 958.]

GEORGIA—Company May Reassign Seats in Carrying Out Jim Crow Law.

Where a State law requires the separation of white and colored passengers in street cars, a conductor has the right not only to assign a seat at the time a passenger enters the car, but to make such necessary reassignments as the exigencies of the traffic may require. [Savannah Electric Co. vs. Lowe, 108 Southeast Rep. 313.]

MASSACHUSETTS—Conditions Precedent to Becoming Passenger.

Any one in proper condition, who takes hold of the grabhandle, places his foot on the step and begins to enter a car is a passenger, if the car is at a regular stopping place in the street for the purpose of receiving passengers and persons were invited to enter and become passengers. [Franz vs. Holyoke Street Railway, 132 Northeast. Rep. 270.]

MICHIGAN—City Has Power to Oust Railway on Expiration of Franchise.

The Common Council of Detroit under the charter of the city has power to exercise control over the use of its streets and to direct the institution of a suit to oust a street railway company from the streets as to which its franchises from the city have expired. [City of Detroit vs. Detroit United Ry., 184 Northwest Rep. 516.]

MISSOURI—Excessive Speed Not Necessarily Cause of Accident.

Negligence not being actionable unless it produces an injury, an instruction authorizing recovery must require a finding that the negligence complained of was the proximate cause of the injury. Hence, in an action for the death of a pedestrian struck by a street car, an instruction that if the car was being run at a speed greater than 15 m.p.h. and the deceased was exercising ordinary care for his own safety, the company would be liable, was erroneous as not requiring a finding of specific and definite facts, from which it necessarily followed that the negligence was the cause of the injury. [Lackey vs. United Railways 231 Southwest. Rep. 956.]

MISSOURI—Street Railway Held Not Negligent in Maintaining Defective Grabhandle.

A street railway could not be held negligent for maintaining a grabhandle on a street car which contained a defect not discoverable except by breaking the brass casting holding the rail, where the grabhandle was inspected from time to time by stepping on the step and jerking on it, as far as injuries to one not a passenger was concerned. [Galloway vs. Kansas City Rys., 223 Southwest. Rep. 385.]

MISSOURI—Denial by Commission of Railway Company's Right to Issue Bonds Held Impairment of Contract Right.

Under the terms of a railway company's mortgage it has the right to issue bonds to cover additions and extensions upon showing net earnings double its interest charges; when, however, it proposed to issue bonds on additions it was found that part of the expenditures were made more than five years prior to its application to the Public Service Commission for authority to issue such bonds, the delay in making such application being due to the fact that the company could not show the requisite net earnings prior to its application. By the Public Service Act of the State, the commission is prohibited from authorizing the issuance of bonds for additions made more than five years prior to the application. Nevertheless the court held that the application should be granted in spite of the law, because otherwise the law would be unconstitutional, as impairing the company's contract right to issue such bonds, contrary to Const. U. S. Art. 1, Sec. 10. [State ex rel. Joplin & Pittsburgh Ry. vs. Public Service Commission, 223 Southwest. Rep. 388.]

SOUTH CAROLINA—Place in Street Where Street Car Passenger Alights Is Not a Station.

A public street in a city, at a point where a street car stops for passengers to alight, is not to be regarded as a passenger station, in determining the duty of the company toward its passengers, and a passenger who stepped on a banana peel and fell cannot recover. [Thompson et al. vs. Greenville Traction Co., 107 Southeast. Rep., 911.]

Personal Mention

J. A. Crilly Has Long Service

"I hope John A. Crilly will be with the Connecticut Company many more years," declared Nathaniel J. Scott, manager of the Hartford Division, in commenting upon the fifty-seventh anniversary of Mr. Crilly's service, which was celebrated April 7. Mr. Crilly entered the company's ranks in 1865, when it was known as the Hartford & Wethersfield Horse Railway, and for many years was chief claim adjuster. Since 1916, when he retired from this position, he has been doing special work for the company.

Mr. Crilly's first work with the company was taking care of horses at \$8 a week. Even his next work was still somewhat distantly removed from modern electric railways, for he did the blacksmithing for the company. He became yard foreman, and when the company changed from horse cars to electric apparatus Mr. Crilly was in charge of selling the horses. He sold 750 and is proud of his record. Thereafter he was acting superintendent, by appointment of President E. S. Goodrich, until 1895, when he became chief adjuster. He was succeeded in that work by his son, John A. Crilly, Jr.

The service record of Mr. Crilly is excelled by few others in the country.

Los Angeles Railway Makes Changes

Changes in the auditing department of the Los Angeles (Cal.) Railway have been announced. O. J. Hastings becomes assistant auditor. He was formerly chief clerk. This position has been filled by G. W. McDonald. H. E. Gaskell has been appointed chief accountant and statistician, and S. J. Nock head bookkeeper and accountant.

George E. Falk, formerly safety director for Henry L. Doherty & Company, with headquarters at their New York office, has been assigned to the Community Traction Company and the Toledo Edison Company, at Toledo, as head of all the safety work. He plans a general all-year campaign on "safety" and has already secured the co-operation of the Toledo Automobile Club and the public schools in an effort to put over a safety course through the public schools. Mr. Falk has been with the Doherty interests for nine years. He started in the gas offices of subsidiaries in New York State.

George P. Good, who has served for many years in the transportation department of the Philadelphia (Pa.) Rapid Transit Company, has been appointed superintendent of transportation. Elbert G. Allen has been appointed chief engineer. Mr. Good started work with the company twenty-eight

years ago, when cable cars were still used. Mr. Allen, a graduate of the Massachusetts Institute of Technology, was associated in an advisory capacity with Stone & Webster in the construction of Hog Island. His appointment has been referred to previously in the ELECTRIC RAILWAY JOURNAL.

Obituary

Howard E. Huntington

Howard Edward Huntington, vice-president of the Los Angeles (Cal.) Railway and only son of Henry E. Huntington, president of the company, died March 27 at the age of forty-six.

Private burial service was conducted on March 29 and as a mark of respect all trolley cars in Los Angeles stopped for one minute at 10 a.m., the time of the funeral. All machinery, except substation motors, was stopped for five minutes and the main offices closed for half a day.

Mr. Huntington began his railway career in 1894 with the late Epes Randolph, builder of the Southern Pacific Railway of Mexico. In 1903 he began his actual experience in Los Angeles traction activities as a worker in the electrical department of the shops.

Upon the death of J. A. Muir, then general manager, Mr. Huntington was appointed to the position.

He continued as active head of the railway until 1911 when he made a trip to Europe for his health. He retained the title of general manager until 1918, when George J. Kuhrtz, the present general manager, was appointed. During the war he served as a dollar-a-year man with the shipping board and supervised important phases of shipbuilding work at Los Angeles Harbor and Oakland, Cal.

Knox Taylor, president of the Taylor-Wharton Iron & Steel Company, and vice-president of the American Railway Business Association, died April 4, at his home in High Bridge, N. J. During the war his company aided in supplying railway track material for use abroad, and he himself was the representative of the leading manufacturers of this product in dealings with the Government. Mr. Taylor worked through all the departments of the Taylor Iron & Steel Company, and finally became president. In 1912 this company purchased the William Wharton, Jr., & Company, Inc., and the Philadelphia Roll & Machine Company, and Mr. Taylor became president of the new Taylor-Wharton Iron & Steel Company. The Taylor and Wharton Companies had originated the use of manganese steel in trackwork.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

New Electric Line Planned for Florida

Sanford, Fla., suburban trolley lines linking up Sanford (Fla.) and intermediate points south to Plant City, where it is confidently expected the Tampa Electric Company will meet it, is the plan being promoted by Frank J. Ryan, vice-president of the Orland Mortgage & Loan Company, and F. F. Ange, president of the Bank of Orange, Orlando, Fla. The proposed lines would provide a scenic route through Florida linking with the St. John's River north from Sanford so as to appeal to the tourists. Orlando would be headquarters and the route would include Winter Park, Orlando, Kissimmee, Loughman, Haines City, Lake Alfred, Auburndale, Lakeland and Plant City, with spurs out of Orlando to Daytona and Tavarese. It would offer competition to high freight rail rates by a joint trolley and water rate to Jacksonville and an all-trolley rate to Tampa and Orlando, the three principal consuming centers of the region. One of the biggest lumber mills in the south is at Loughman and its owners are understood to be interested in the project. Mr. Ryan's estimates are that it will require \$12,000,000 to lay the lines and equip the various companies which would operate over the tracks. Mr. Ryan states that negotiations have progressed with Northern financiers far enough to practically assure consummation of the project.

Ohio Road Will Buy Power

Indiana, Columbus & Eastern Traction Co., Springfield, Ohio, will operate cars with power furnished by the Dayton Light, Heat & Power Co. not later than June 1, according to a statement issued today by G. D. Nicoll, superintendent of power equipment for the road. At present the company is supplying its own power, but the contract with the Dayton company will furnish service cheaper than the traction line can produce it, company officials say. New rotary converters are being installed at the various substations and new substation buildings are being constructed at Medway on the Dayton-Springfield division and at Donovan's Mill on the Springfield-Lima division. Operation of the power plant at Medway will stop as soon as the Dayton service begins and it is regarded as probable that the plant will be entirely demolished, although some of the executives are said to favor the retention of the plant for emergency purposes. The Dayton service will be transmitted at 11,000 volts, the same as at present, but with alternations at 60 cycles instead of 50. It was this change which required

the installation of new converters. The contract between the traction line and the Dayton company was recently approved by the State Public Utilities Commission.

Orders for 151 Safety Cars Placed

The Stone & Webster Company recently placed orders for 136 Birney safety cars. Of these eighty-nine were ordered from the St. Louis Car Company and forty-seven from the American Car Company. These cars will be used as follows: Houston, Tex., 35; Columbus, Ga., 3; Savannah, Ga., 30; Tampa, Fla., 24; Pensacola, Fla., 8, and Jacksonville, Fla., 36.

In addition to these the Chicago, South Bend & Northern Indiana Railway has placed an order for fifteen safety cars with the J. G. Brill Company.

Advice on Foreign Market Conditions

A feature of the ninth National Foreign Trade Convention in Philadelphia, to be held on May 10, 11 and 12, will be the furnishing of trade advisers to give information on foreign trade questions. These advisers have been selected from business men who have spent years in foreign trade and they will furnish information regarding market, shipping, finance, sales and advertising methods, and other items considered as obstacles to entering foreign markets.

Westinghouse Air Brake Report

The Westinghouse Air Brake Company earned \$1,412,490 net during 1921. This was exclusive of loss due to shrinkage in inventory prices, amounting to \$2,307,854, charged against reserves created for that purpose. With this adjustment the inventory stands at \$10,802,328, as compared with \$15,628,811 on Dec. 31, 1920. In commenting on the general situation the officers say:

"As outlined in our last annual report for the stockholders, we entered the year 1921 with a fair volume of unfilled orders on hand, and as a consequence our shipments for the first quarter were fairly satisfactory; but on account of the general business depression and particularly the curtailing of purchases by the railroads of the country, our orders received during the year under review amounted to less than 50 per cent of normal, which resulted in plant operation and shipment for the year of approximately this same percentage. Under existing conditions, it would be difficult and useless to endeavor to forecast the future."

San Francisco Car Contracts Awarded

Contracts were awarded on April 4 for twenty new cars for the San Francisco Municipal Railways. The contracts are for the construction and assembling of cars of the center entrance type, at a cost of almost \$200,000. The bids accepted, according to City Engineer M. M. O'Shaughnessy, are approximately \$1,200 cheaper per car than the estimate made several months ago. The contract for the body and trucks went to the American Car Company of St. Louis at \$5,187 per car; trucks and wheels to the same company at \$1,312.50 per car. The Westinghouse Traction Brake Company was awarded the contract for the air brakes, the total contract being for \$11,363.73. The Westinghouse Electric & Manufacturing Company was given the contract for the electrical apparatus, motors, etc., the contract totaling \$49,503.66.

General Electric Submits 1921 Report

The thirtieth annual report of the General Electric Company, Schenectady, N. Y., reports orders received in 1921 were \$179,722,000, as compared with \$318,470,438 for 1920. For the first quarter of 1922 orders received have been at an annual rate in excess of \$200,000,000. Net sales billed were \$221,007,992, compared with \$275,758,488 for 1920. A surplus in excess of cash dividends for the year 1921 was \$8,243,290. C. A. Coffin, chairman of the board of directors, in a statement to the stockholders, characterized 1921 as an exceptionally trying and difficult year "with its contraction in business and the unavoidable processes of readjustment."

The report states that inventories in factories and warehouses and on consignment have been taken with the usual care and valued in accordance with the custom of the company at cost or market, whichever is lower. Investment securities have been carefully revalued according to the statement and a reserve of \$3,700,000 has been established to safeguard the company's interest in associated manufacturing and selling companies against inventory or other shrinkage. They are now carried at a net value of \$75,326,382.

Metal, Coal and Material Prices

Metals—New York		April 11, 1922
Copper, electrolytic, cents per lb.	12.875	
Copper wire base, cents per lb.	14.125	
Lead, cents per lb.	5.05	
Zinc, cents per lb.	5.25	
Tin, Straits, cents per lb.	30.375	
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	\$4.60	
Somerset mine run, Boston, net tons	2.10	
Pittsburgh, mine run, Pittsburgh, net tons		
Franklin, Ill., screenings, Chicago, net tons	2.625	
Central, Ill., screenings, Chicago, net tons	1.875	
Kansas screenings, Kansas City, net tons	2.30	
Materials		
Rubber-covered wire, N. Y., cents per lb.	5.90	
Weatherproof wire base, N. Y., cents per lb.	15.50	
Cement, Chicago net prices, without bags	\$1.97	
Linseed oil, (5-bbl. lots), N. Y., cents per gal.	84.00	
White lead, (100-lb. keg), N. Y., cents per lb.	12.25	
Turpentine (bbl. lots), N. Y., cents per gal.	88.00	

Rolling Stock

Columbus, Delaware & Marion Electric Company, Columbus, Ohio, contemplates the addition of one more freight car owing to increase in business.

Houston (Tex.) Traction Company plans to purchase immediately thirty-five new cars at a cost of \$270,000, according to an outline of the company's proposed improvements submitted to the City Council by Luke C. Bradley, district representative of Stone & Webster. Mr. Bradley also told the City Council that the company will paint and overhaul thirty-six cars it now owns that have been in the carhouses unused for some time.

Chicago (Ill.) Surface Lines expect to be in the market very soon for 100 new cars. Of these, seven will be trailers to replace the trailers burned in the Devon carhouse fire which occurred in January. The others will probably be of the double-truck one-man safety type, like the sample recently built and described in the *ELECTRIC RAILWAY JOURNAL* for Jan. 14, 1922. The insurance money received for the cars destroyed in the Devon fire is sufficient to finance a large proportion of these new cars.

Track and Roadway

Houston (Tex.) Electric Company has begun to double track its line on Lorraine Street from Gano to Maury Streets.

Pennsylvania & New Jersey Railway, Trenton, N. J., is placing a new curve in the road at Hulmeville, Pa., and otherwise repairing the road in that section.

Municipal Railway of San Francisco received bids on March 29 for track construction on Liberty Street between Church and Sanchez. The cost of the work will be approximately \$60,000.

Indiana Service Corporation, Fort Wayne, Ind., will soon start work on the double tracking of the West Main Street line, according to S. W. Greenland, vice-president and general manager. The franchise for this work was granted last year.

Michigan Railway, Kalamazoo, Mich., will start work on its \$100,000 improvement program just as soon as warm weather comes. The principal item calls for the relaying of track on Portage Street from Washington Avenue to Lovell Street.

Public Service Railway, Newark, N. J., through Harry C. Stevenson, its representative, has informed the Hadonfield, N. J., city officials that the corporation will make repairs in King's Highway in the early spring. Mr. Stevenson made this announcement after an inspection of the road.

Murphysboro & Southern Illinois Railway, Murphysboro, Ill., has an-

nounced through its president that it will extend its interurban line from Carbondale to Herrin, work beginning about May 1. The citizens' subscriptions to the preferred stock justified the extension.

Harrisburg (Pa.) Railways will probably begin the work about April 1 of improving North Third Street in front of the Capitol and will include paving of the Walnut Street stretch on the south side of the Capitol. The trolley tracks now in Third Street will be shifted to allow for another track and the west side curbing will be moved for widening the sidewalk.

New Jersey & Pennsylvania Traction Company, Trenton, N. J., may be forced to provide additional rails on West Hanover Street. This action is urged so that cars from the Princeton and the Pennsylvania lines can travel on the right hand side of the street. There are two different gages of tracks compelling the cars to travel on the wrong side of the street. The traction company asked that the city cut down the width of the sidewalks instead of putting the corporation to so great an expense. It is said that the cost will amount to about \$75,000.

International Railway, Buffalo, N. Y., in co-operation with the city in its plans for repaving city streets, rebuilt during 1921 more than 20 miles of track. The rehabilitation also represents the complete overhauling of 334 cars, renewal of 38 miles of trolley wire and many other improvements and betterments. The expenditure thus incurred, amounting to over \$3,000,000, entirely consumed the appropriation made from 1921 earnings for maintenance and renewals and approximately \$500,000 of working capital provided by the stockholders.

Memphis (Tenn.) Street Railway, with the Mayor's consent, has made final arrangements for the extension of the crosstown line from Agnes Place to McLemore and the connection of two links in the railway chain on McLemore Street, making a through crosstown route from Poplar and Cleveland Streets to Riverside Park. The company is also making rapid progress in laying its tracks across the Viaduct just erected at McLemore Street over the Yazoo & Mississippi Valley and the Illinois Central Railroad system tracks. The double tracks will first be laid, after which the concrete will be put in. The work is being done under the direction of A. E. Yarbrough of the car company construction department.

Power Houses, Shops and Buildings

Duquesne Light Company, Pittsburgh, Pa., which furnishes power for the Pittsburgh Railways, has authorized the Dwight P. Robinson Company to install two additional boilers of 22,-

914 sq.ft. of surface and to design and construct additions to the company's high-tension substation.

New Orleans Railway & Light Company, New Orleans, La., will probably erect a new office structure instead of repairing the old building recently damaged by fire. The new building if constructed will be five stories in height and will cost about \$500,000. Receiver O'Keefe has had a conference with the security holders on the subject of constructing this new building upon the site of the former quarters of the company.

Philadelphia Electric Company, which supplies power to the Philadelphia Rapid Transit Company, has just placed an order for sixteen 3,750-kva. single-phase transformers for operation at 60 cycles, with a total capacity of 600,000 kva. The total cost of the transformers will be approximately \$100,000. The contract for these transformers is awarded to the Westinghouse Electric & Manufacturing Company, and they are to be used in various substations. They are duplicates of approximately thirty similar Westinghouse units now in operation.

Trade Note

Canton Culvert & Silo Company, Canton, Ohio, manufacturers of "Acme" (Nestable) and "Imperial" riveted corrugated metal culverts, was awarded on March 10 the annual contract for supplying the Pennsylvania State Highway Department's requirements for corrugated metal culverts this season. The contract approximates 42,000 ft. of corrugated culverts.

New Advertising Literature

Ohio Brass Company, Mansfield, Ohio, has issued a folder which describes with pictures its Type A-Ear with its improved Under-run type of construction installed.

Sprague Electric Works, New York, N. Y., has issued a circular descriptive of narrow-unit panelboards of the safety type. This panel is an economy in wall space and price.

Stumpf Una-Flow Engine Company, Inc., Syracuse, N. Y., has issued a Lefax sheet describing and giving information regarding the performance of its una-flow steam engine.

General Electric Company Schenectady N. Y. has just issued descriptive leaflets of type LG-116 indoor disconnecting switches and type QC-3 quick-break lever switch.

Electric Power Club, 1017 Olive Street, St. Louis, Mo., has recently published a handbook on controllers for electric motors. This pamphlet contains simple descriptions of controllers and definitions of the terms used in that connection. Words which do not appear in most dictionaries are explained simply.

P
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"The Peacock Staffless"

A Capacity Brake for Loaded One-Man Cars

LIKE the extra safety valve on a boiler, the hand brake is installed in the one-man safety car not because the rest of the equipment is expected to fail, but because no man or machine is so perfect that the lives of the public can be placed unreservedly in its power.

Laws carefully worked out by trained engineers govern the selection of the proper type and size of boiler safety valves. The choice of hand brakes is left to the individual preference of the purchaser. All the more reason why you, responsible as you are for the safety of the traveling public, should choose an equipment which will positively perform its intended duty, when emergency requires it.

The Peacock Staffless Brake is designed and built on technically correct theory, and has established its adequacy in practice. It has ample power to stop the most heavily loaded safety car, and its almost unlimited chain-winding capacity makes certain that it will work under any conditions.

Specify Peacock Staffless.

National Brake Company, Inc.
890 Ellicott Square, Buffalo, N. Y.



How do you buy car Lubrication

IF YOU WISH to reduce your use of car "out of service" signs per day, we suggest that you buy lubricants only on a *performance basis*. By a *performance basis* we mean the securing of more car miles from every gallon of car oil, air compressor oil and gear lubricant that you use.

Your use of lubricants is only a trifle of your total main-

tenance costs—probably not more than 1/10 of 1%. But in terms of repairs and renewals, lubrication is a "tremendous trifle."

The day of haphazard lubrication is fast drawing to a close.

No Equipment Superintendent who is eager to make economy records for his com-

VACUUM OIL COMPANY



pany and for himself can afford to ignore or to be indifferent to scientifically correct lubrication.

The ability of the Vacuum Oil Company to deliver more car miles per gallon is being demonstrated every day throughout the world—wherever electric street cars run.

The great fund of Vacuum Oil Company experience in reducing maintenance and upkeep costs through Correct Lubrica-

tion—probably the widest experience in the world—is at your service.

We shall be glad to arrange for one of our Engineers to meet your Equipment Superintendent to discuss the lubricating needs of your system more in detail. In writing, kindly address our nearest branch office.

The best oils you can buy are the cheapest in the long run—no matter what the size of your system.



Lubricating Oils

A grade for each type of service

Domestic Branches:

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 DETAILED EXAMINATIONS BY EXPERTS
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 More revenue from more riders
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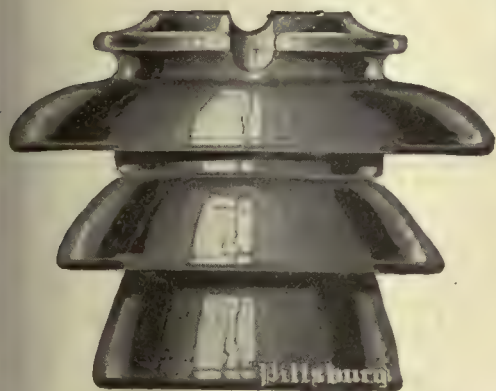
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Estimates

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INSULATORS



of Superior Strength
Mechanically—Electrically

Exhaustive tests in our splendidly equipped laboratory, combined with broad experience in the field have enabled us to design the parts and to proportion the ceramic elements so that Pittsburgh Insulators are as famous for their great mechanical strength as for their di-electric qualities.

Their service record tells the story.

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DETECTIVES

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When writing the advertiser for information or
prices, a mention of the Electric Railway
Journal would be appreciated.

American Protectors Renew The Life of Poles Cheaply



Poles rotted at the ground line, or broken and about to fall, can be salvaged and made stronger than when first set by the simple installation of American Protective Sleeves.

This device made of Armco Ingot Iron, is placed about the base of the pole in two halves, locked together with a key strip and driven into the ground with a sledge, or with the American driving jack.

Poles reinforced in this way are stronger than a new unprotected pole. are unaffected by decay or attack by moisture at the ground line, and the protecting sleeve needs no attention.

The cost of renewing poles in this way is much less than the cost of setting a new pole, and the installation is insurance against fire, and wind storms.

Manufactured by
**The American
Rolling Mill Co.**
Middletown, Ohio

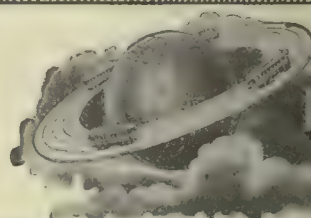
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Write to
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Buy Assured Pole Life

"P & H" Guaranteed Penetration Process

You can absolutely depend upon the "P & H" Guaranteed Penetration Process for longest pole life.

It guarantees a uniform half inch penetration of the preservative throughout the ground line area of the pole.

Furthermore, we agree by written guarantee to refund the Butt-Treating price on any pole that does not show the guaranteed half inch penetration.

TAKE NO CHANCES

Specify the "P & H" Guaranteed Penetration Process.

We can furnish, promptly, treated and untreated Northern White and Western Red Cedar Poles—any form of Butt-Treatment—and we are giving to pole-users the first Guaranteed Penetration Process ever offered in the pole industry—the "P & H"

Send for a copy of our interesting booklet.
"Butt-Treating Cedar Poles at the Page & Hill Plant"

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CITY AND INTERURBAN CARS
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SNOW SWEEPERS, ELECTRIC
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EVERY type of car for America's Electric Railways — from the light weight safety car to the heavy interurban built for high speed — is produced in the shops of the McGuire-Cummings Manufacturing Co.

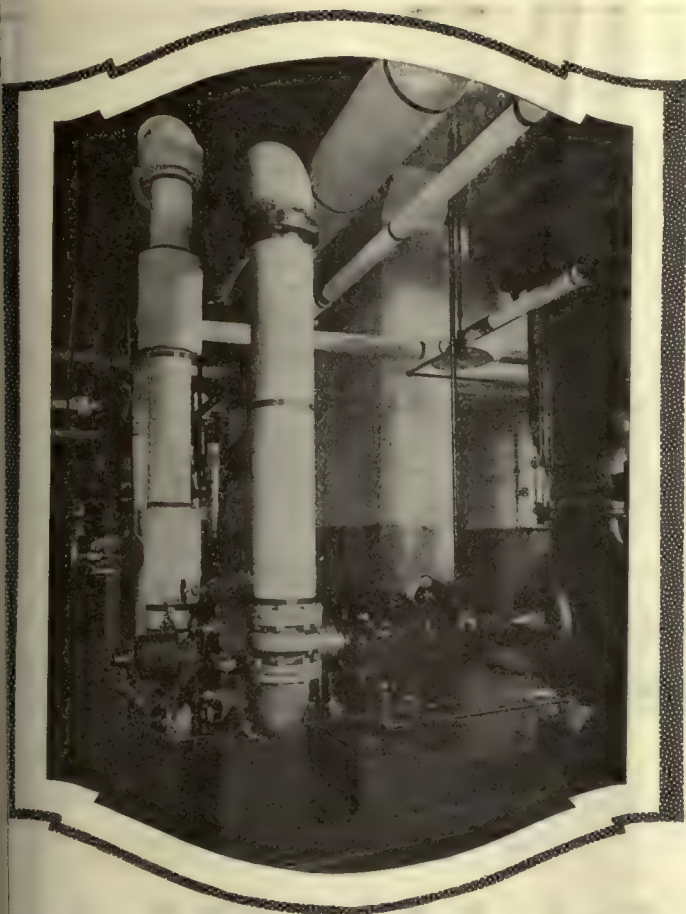
For more than twenty years this organization has specialized in the manufacture of cars and trucks for the country's leading Electric Railways. Performance records in practically every state in the union testify to the strength, safety, efficiency and long life of rolling stock built by this Company.

Our Engineering Department is at your service whenever the question of new equipment comes up for discussion.

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Eliminate Shut-Downs

Terry Turbines receive their energy directly from the boiler, avoiding the cycle of main unit, generator, fuses, switchboard and wiring required by motors.

Terry Turbine and Gears driving Condenser Removal Pump. If this unit should shut down, the main unit would have to be stopped long enough to permit the condenser shell to cool before condensing operation could again be resumed.

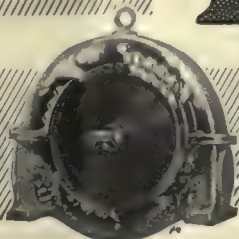
When selecting the drive for power plant auxiliaries, the significance of the above statement should be borne in mind. What more direct method of eliminating shutdowns could be devised than to eliminate the external sources of shutdown? Then dependability of service would rest only with the driving apparatus itself.

The single-stage steam turbine is the most simple prime mover. It cannot be injured from overload, making it unnecessary to provide an efficient over-size unit. Its fuel consumption per horsepower is less than one-quarter that of the most efficient condensing turbine. It is, in short, the ideal drive for auxiliaries.

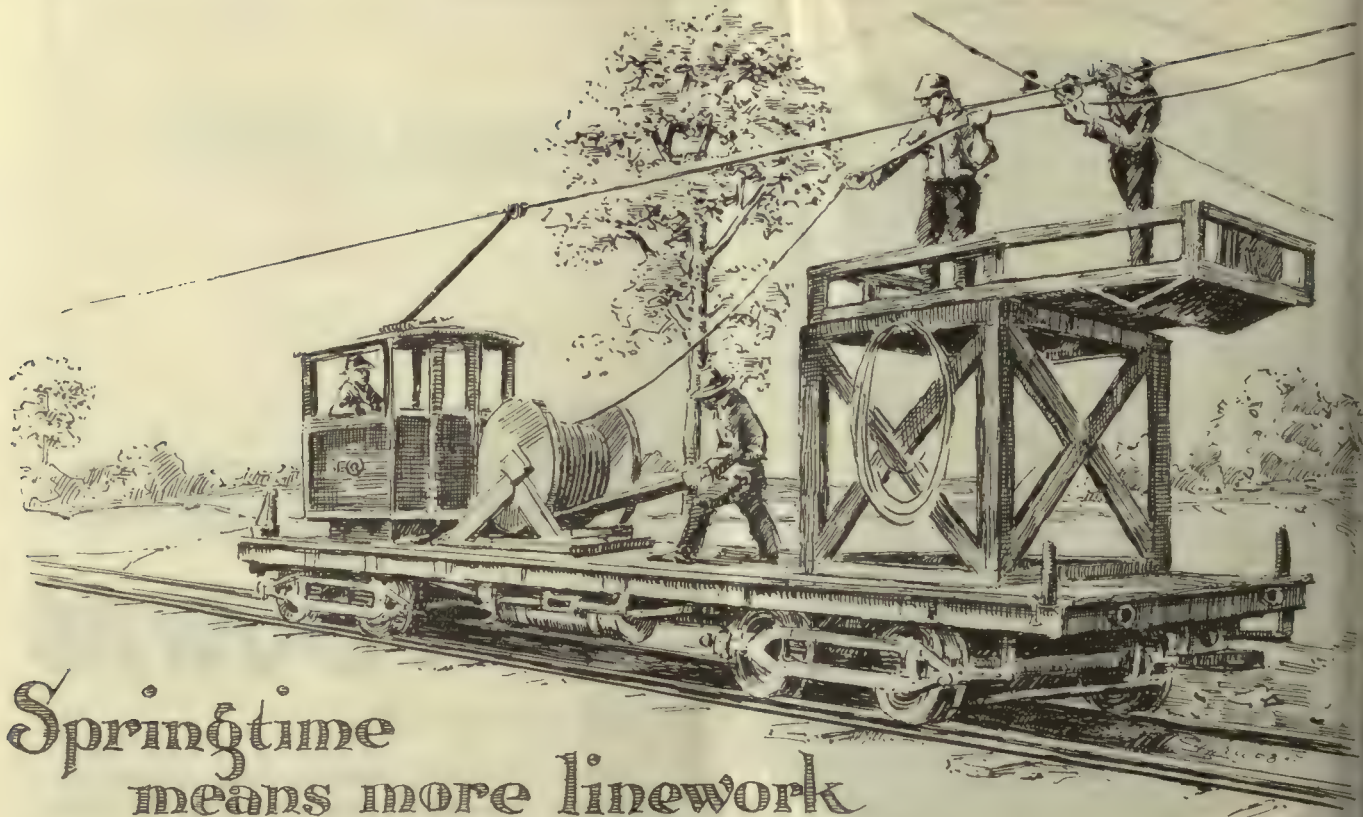
THE TERRY TURBINE

T-760

Offices in Principal Cities
in U.S.A. also in Important
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The Terry Steam Turbine Co.
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Springtime
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Figure your line renewals now and start getting quotations on materials.

Columbia Ears are made according to well-tested designs. Only fresh metals, correctly alloyed for maximum durability, are used.

Our prices are in line and deliveries prompt.

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Trolley—Splicing—Feeder

EARS



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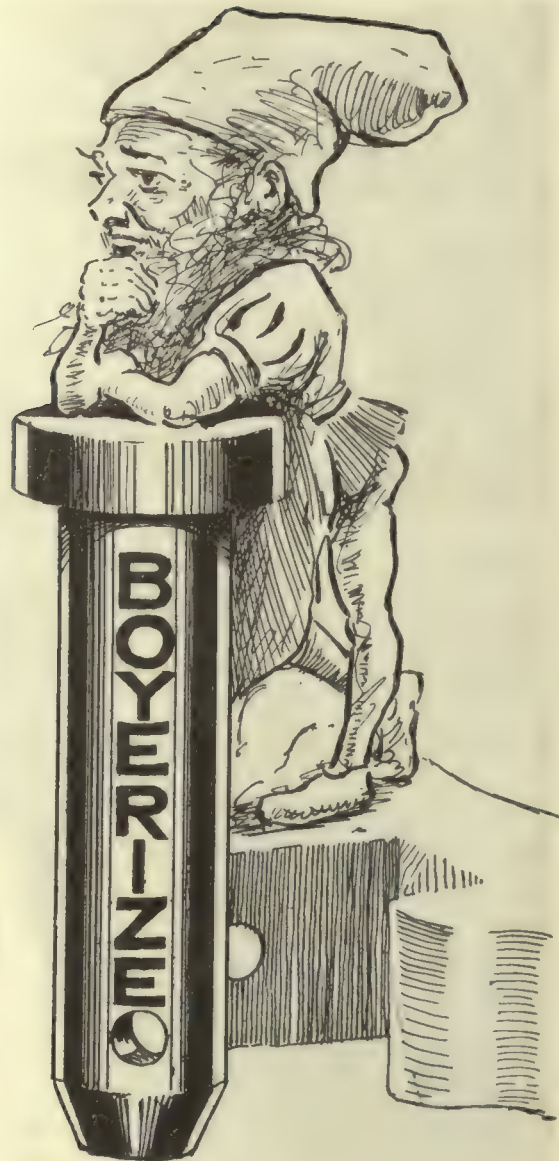
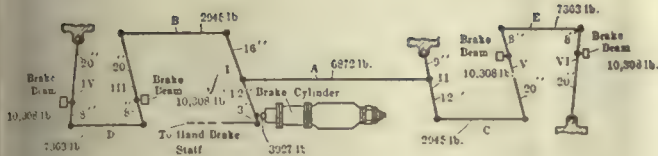
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Lost Motion?

Boyerizing Reduces Loss!

Every worn joint in the brake rigging means useless "play" and requires additional piston travel to take it up. Compressed air costs too much to be wasted unnecessarily.

Boyerized pins and bushings wear three or four times as long as ordinary untreated ones. They save their own cost many times over in longer life and reduced lost motion.

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IF you want to get an honest return for the money, time and labor you spend in rebabbitting your armature bearings use M-J ARMATURE BABBITT.

Cheap or inferior metal in the motor bearings means frequent rebabbitting and consequent loss in time, as well as a heavy increase in material and labor cost.

It is much better to use a good metal such as M-J ARMATURE BABBITT than to clog up your journals with perhaps harmful material. There is no cheaper babbitt that will do the work as well.

M-J ARMATURE BABBITT is a tin base nickel hardened metal made especially for street railway armature bearing service. Its economy has been repeatedly demonstrated. Considered standard throughout the world.

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TROLLEY WHEELS:
V-K Oilless, M-J Lubricated
HARPS: V-K Non-Arcing
BEARINGS: "Tiger"
Bronze
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ARMATURE BABBITT
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The

H. H.

Trolley Wheel

Is Held on the Wire

IT cannot jump or roll itself off the line at curves or rough spots, because the stationary flanges will not let it go.

Notice the construction. Cold-rolled steel flanges which *do not turn* are fastened outside the wheel itself. They only touch the wire when the wheel tries to leave it—then they do their work, and the wheel stays on the line.

The H. H. Trolley Wheel is most economical to maintain. It is very carefully and accurately manufactured, with all parts readily interchangeable, reducing repair bills to a minimum.

Order one to try!

The H. H. Trolley Supply Co.

Manufacturers of Trolley Wheels and Harps

Payne Ave. and East 33rd St.
Cleveland, Ohio



Bates Poles in Trolley Construction, Sydney, N. S. W.

Bates Steel Poles Have Longest Life

The first cost of Bates Poles is lowest.

Their service life is longest.

These two factors explain why Bates Poles are now used in all parts of the world in all types and varieties of construction.

From the Arctic Circle and the stress of its winter storms to the Tropics with their vicious corrosion, the Bates Pole stands recognized as pre-eminent.

No other pole can be so completely protected from corrosion.

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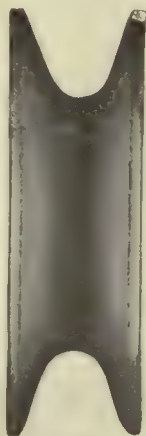
Let our Engineers talk Bates Pole facts to you.

B E S T Bates Expanded Steel Truss Co.

208 South La Salle Street, Chicago, U. S. A.

Prices will win in 1922

Add this to Bates Quality, Service
and Longevity



"U"

Speed and Safety

will result from the constant use of Bayonet Equipment. Renewals made instantly.

Bayonet Special Trolley Wheels

are made from the highest grade metal and are hand turned, insuring greatest accuracy and balance. Reputation was gained by competitive tests.



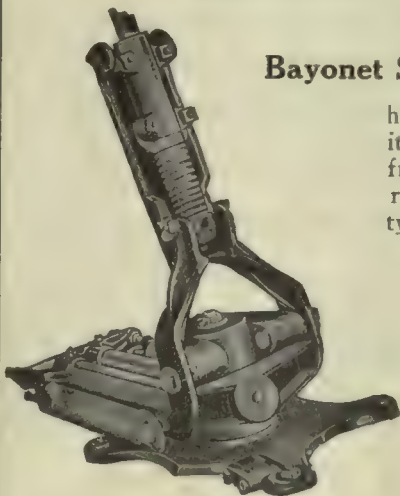
Bayonet Detachable Trolley Harps

are the only trolley harps with which you can change from wheel to sleet cutter or to a new wheel in ten seconds. No tools required on top of the car. Inspections, repairs, adjustments and lubricating done at work bench later on when no schedules are being held up.



Bayonet Trolley Base with Detachable Pole Clamp

is the only trolley clamp made on which the trolley pole can be changed in 30 seconds and the wheel be in perfect alignment with the wire. No tools are required to do this job. It prevents schedules being delayed. A uniform wire pressure at all angles of the pole is obtained, thus saving on your overhead, wheel and wire.



Bayonet Sleet Cutters

have no superiors when it comes to cutting ice from the wire. Both rigid and semi-rotary types furnished.

Bayonet Trolley Harp Co.
Springfield, Ohio

3

(Three)

Simple Parts

and only three parts, make up White's Porcelain Trolley Hanger. This is a big advantage in shortening the time and labor of installation and in lengthening the service life of the hanger.



WHITE'S
Porcelain

Trolley Hanger

consists of the sherardized malleable iron yoke, the heavy glazed porcelain insulator and the "stud"—a standard bolt, sherardized or furnished in bronze.

The illustration will convince you of the ease of installation and alignment. You can see that this hanger will give service, too—there is no possibility of the insulation "breaking down" or cracking.

We will send you a sample and it will tell its own story to you. Let us give you quotations on complete hangers or parts which we have in stock for

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1122 Pine Street, St. Louis, Mo.

Foreign Representatives: Forest City Electrical Service
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“ALL-HEART” “TIDEWATER” **CYPRESS** “THE WOOD ETERNAL”

because of its being so nearly *rot-proof*, insures a long service-life when used

**FOR CROSSARMS, TIES,
TRUNKING, CAPPING,
FENCING**

and other railroad requirements, as a number of the officials of the biggest railways in the country have proved to their entire satisfaction.

“ALL-HEART” CYPRESS
**SAVES LABOR COSTS FOR
RENEWALS and
REPLACEMENTS**

—items which sometimes exceed the first cost of the material itself—so, *for true economy's sake,*

USE “ALL-HEART”
“TIDEWATER”
CYPRESS
“THE WOOD ETERNAL”

Look for the Cypress  on the ends of every wide-mark “Arrow” board, and on bundles.

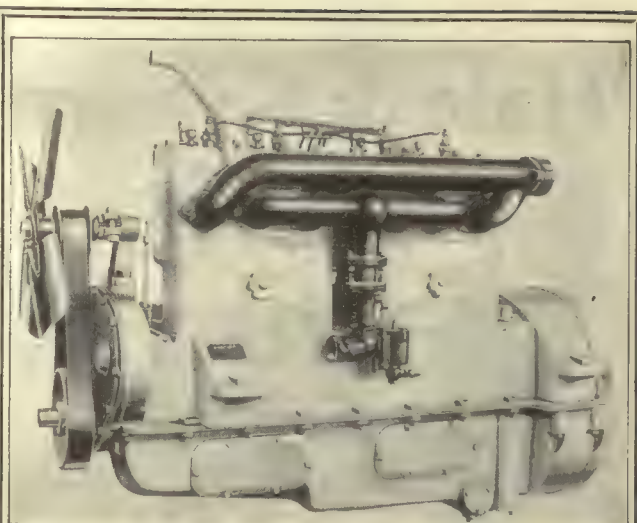
is a guarantee of proper grading at the mill in accordance with the scrupulously high standards set by this Association for the protection of its members and their customers.

May we submit data to prove to you the importance—and economy—of selecting All-Heart Cypress for the railroad uses above mentioned?

Please address us at office nearest you.

SOUTHERN CYPRESS MFRS.' ASSN

1265 Poydras Building, New Orleans, La., or
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**When It
Comes to the
Engine**

**Check
Any Other
Power Plant
with CLIMAX
—Then Decide**

Climax internal combustion engines meet all requirements for sturdy construction, simplicity, accessibility, economical operation and freedom from trouble. The service organization behind them insures satisfaction.

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“THE ENGINE”

Made by
Climax Engineering Co.
8 W. 18th Ave., Clinton, Iowa

Builders of Internal Combustion Engines for Automotive and Industrial Power Purposes

Hale & Kilburn SEATS



All Steel Seat
Rattan Spring Cushion

*Lead the
World
in the
qualities
that count*

Neatness
Lightness
Simplicity
Strength



Light
Weight
Steel Seat

No Costlier Than Others

Write
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Particulars



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Hale & Kilburn Corporation

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FRISCO
71 First St.

To bring the American Manufacturer closer to the Spanish-reading Engineer

INGENIERÍA INTERNACIONAL announces the appointment of Philip Seabury Smith as associate editor. Mr. Smith's intimate knowledge of Latin America and Spain will be of inestimable value to the Spanish-reading engineer and to the American manufacturer.

READERS of *Ingeniería Internacional* will follow Mr. Smith's work with particular interest because of the need for new methods and equipment to cut their costs of construction, production and operation.

AMERICAN MANUFACTURERS of equipment, materials and supplies used in the industries served by *Ingeniería Internacional* will be helped, in selling their proper quotas abroad, by Mr. Smith's accurate knowledge of these needs.

INGENIERÍA INTERNACIONAL is expanding its editorial services at this time because it believes that "1922 will be a year of recuperation."



PHILIP S. SMITH
becomes Associate Editor of
INGENIERÍA INTERNACIONAL

PHILIP S. SMITH (Ph.B., Yale University) began his career with the General Electric Company in 1907. During the last five years of his experience with this company, he had general supervision of the sale of motors and miscellaneous apparatus throughout the world. Since March 1916, he has been with the U. S. Department of Commerce and last year he was made Chief of the Latin-American Division.

Mr. Smith has made a thorough study of every phase of commercial activity in the engi-

neering and industrial field. He has traveled extensively through Latin America and Spain and is the author of ninety-three industrial reports for American manufacturers. Few engineers have had an opportunity to investigate such a wide variety of projects.

As associate editor, Mr. Smith will assist the editor-in-chief, Mr. Havens, to strengthen *Ingeniería Internacional's* effective work in developing the foreign commerce of the United States.

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Some people think that when they stay in a rut and continue to use out-of-date material, as long as their maintenance cost is not more than for previous years, they have lost nothing.

That's all wrong. if there's something better and you pass it up, you lose the difference between your present costs and what they might be. It's not a loss on the ledger but a loss against your efficiency.

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SLACK in the brakes shortens brake-shoe life. Brake shoes are costly and car-house labor even more so. Inspections and upkeep require too large a force on most railways. Safety and revenue mileage cannot be increased where brake shoes are improperly set with resulting slow rates of braking and poor stops. Railway executives must face these facts squarely.

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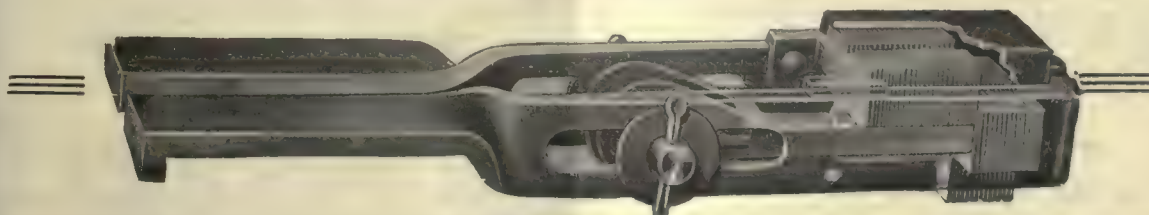
S-W brake slack adjusters eliminate the old-time night inspections, waste of air because shoes are always at the correct distance from the wheel, and unnecessary strains on the brake rigging.

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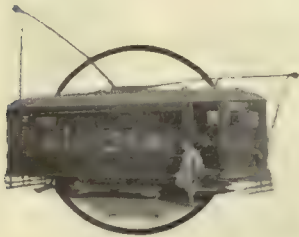
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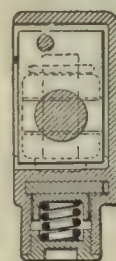
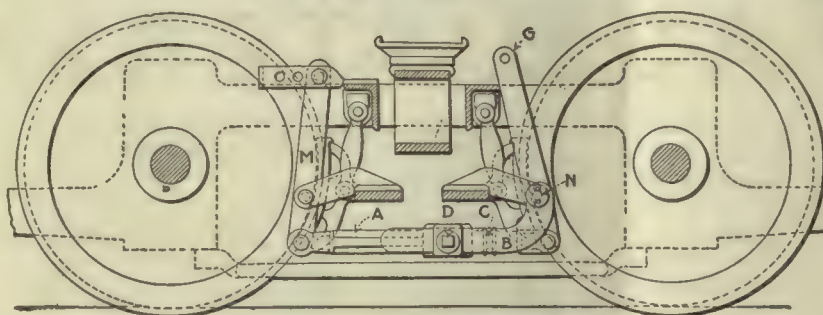
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They are none too many now! You can't afford to lose any more to the private automobile or the jitney temptation.

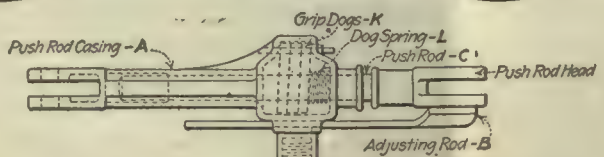
If you break faith—by failing to give frequent, fast and regular service to those who ride, what chance have you of retaining their permanent friendship. And the friendship and good will of the public are, after all, a Public Utility's main asset.

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**GOULD
Slack
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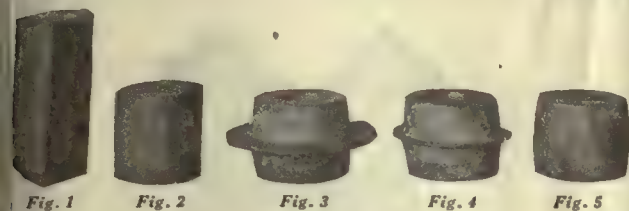
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The illustrations above show the various steps in forging Nuttall special drop-forged motor pinion blanks.

Figure 1—Section cut from square rolled billet.

Figure 2—Billet upset and rounded.

Figure 3—Blank rough forged—first forming operation in retaining die.

Figure 4—Blank finish forged—second forming operation in retaining die.

Figure 5—Blank sized and trimmed—ready for machining.

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This process produces a basic material with close-grained interwoven fibres—free from the type of forging flow lines common in rolled bars.

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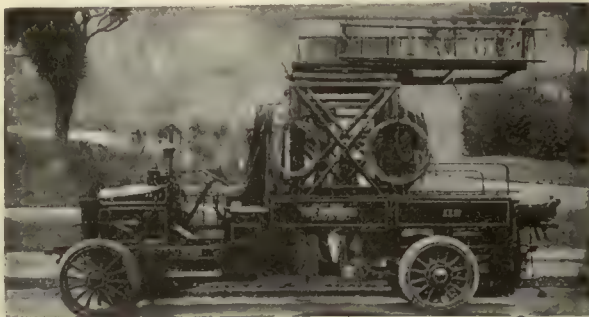
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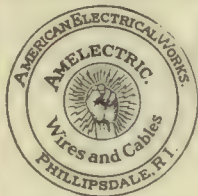
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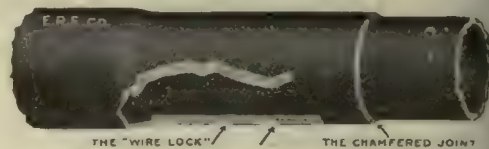
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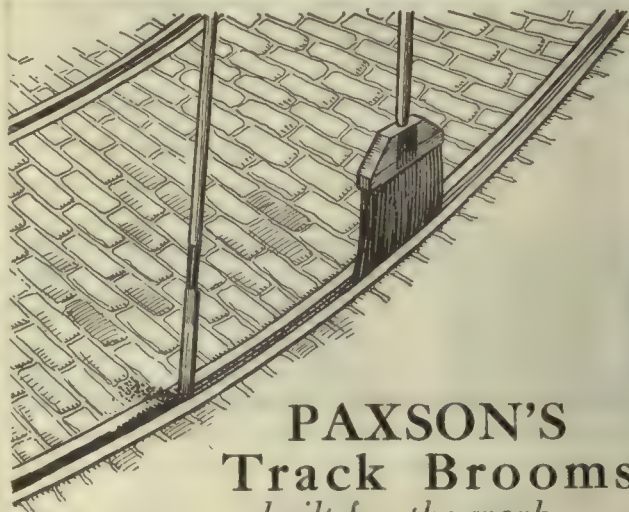
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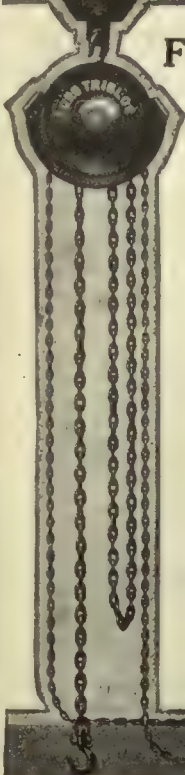
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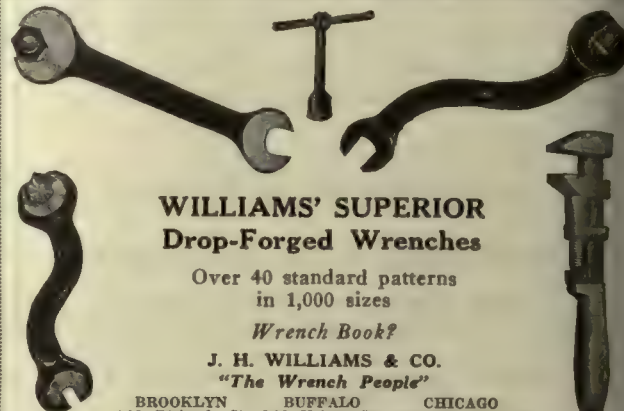


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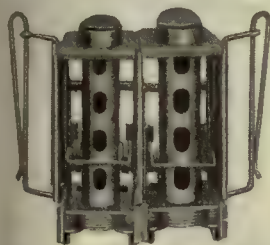
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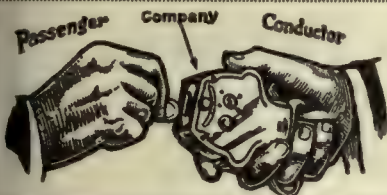
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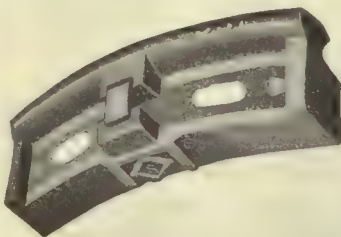
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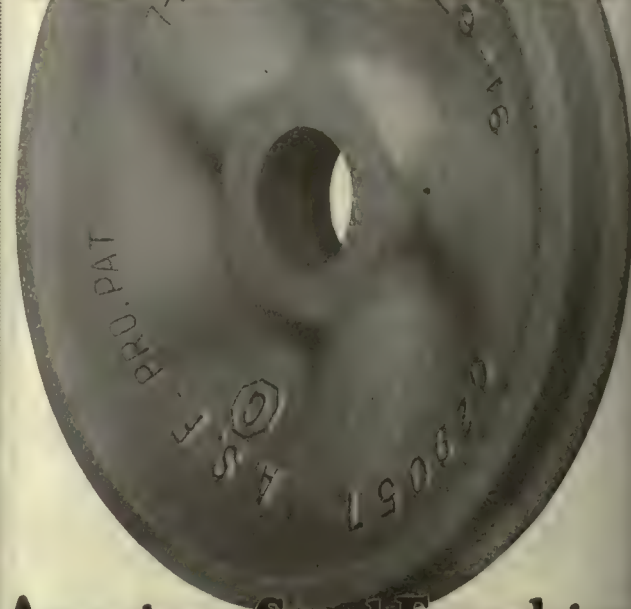
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wears longer—runs cooler—costs less

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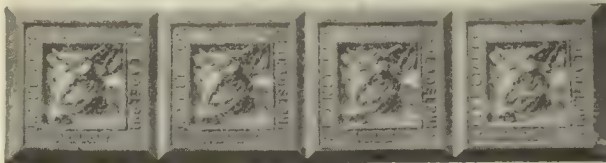
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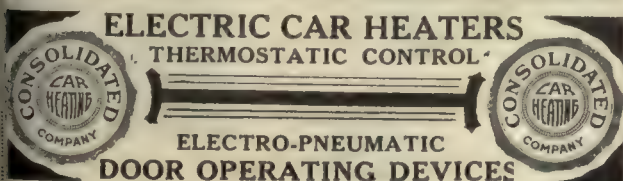
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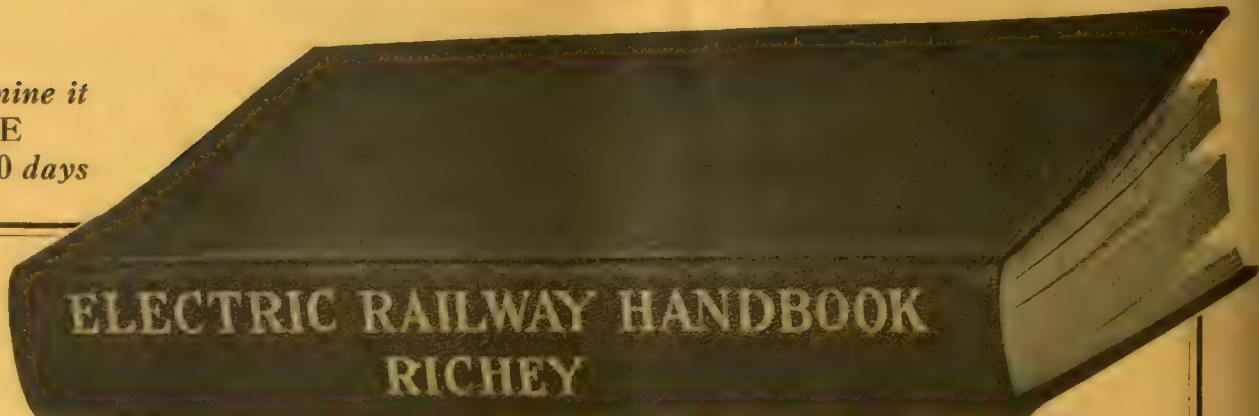
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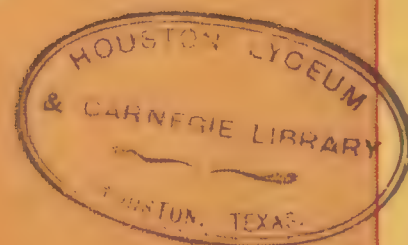
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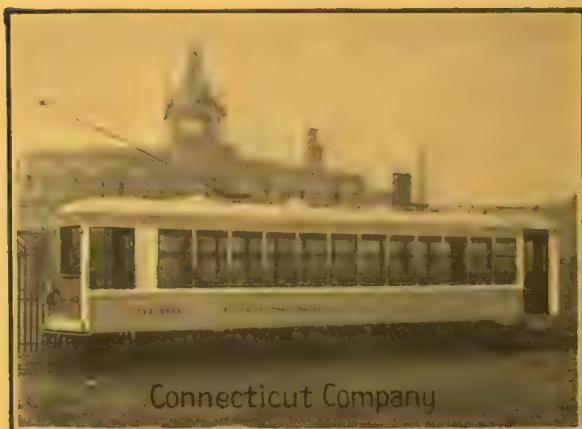
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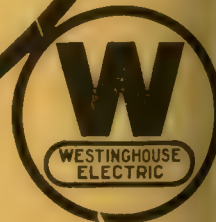
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A Limitation on Our Service to You—

The Second-Class Postage Rate

A SERIOUS handicap to the publishing business in the service to its readers and customers is the present high second-class postal rate.

During the war the second-class postal rates, or those paid by the newspapers of the country, were increased on a sliding scale, until now they amount to four times the pre-war charges. While paying this high special tax, the publishers have also been paying all the other taxes levied upon industry as a whole, and are still suffering under high costs for labor, paper and other essentials.

This increased tax when most other taxes are being reduced is not only unfair, but it is unwise, and imposes a limitation upon the service which publications that go by mail can render.

At present the industries of the country are trying to get on their feet. If orders are placed, mills can begin running again and unemployment grow less. It will readily be admitted that the present, at any rate, would be an unwise time to keep war time taxes on traveling salesmen or on the introduction of efficient methods of production. Yet this is just what the present postal rate on second-class mail matter is doing. The advertising pages of a periodical are traveling salesmen, while the reading pages, at least of a technical paper, stimulate the introduction of more efficient means of production.

Again, the taxation of the publications may be likened to the taxation of education. A bill to tax schools would be abhorrent, yet but 7 per cent of the boys and girls of this country go beyond the grammar grades. The rest of their education must come from reading, and higher postal rates mean a tax on their principal means of self-education.

Some large magazines have been forced out of the mails and now are being distributed by express, motor truck, freight or other means. Unfortunately, some of the most necessary publications cannot be shipped in bulk lots in this way. Among this class of papers are the business and technical papers going to retailers, factories and professional men, the farm papers which are raising the standards of agriculture, the religious papers which promote the spiritual life of the country, the fraternal publications which bind together groups of men and women for their common good, the educational papers, and many others of similar kind.

In a later issue a statement will be given of what the publishers are asking Congress to do.



READY FOR SERVICE

Some of the 50 large new all-steel cars going into operation on the Frankford Elevated Railway, Philadelphia.

—all equipped with ELECTRO-PNEUMATIC

Westinghouse Electro-Pneumatic brake equipment (Schedule AMUE) is recognized as an essential factor in the successful operation of modern high-speed elevated and subway trains.

Representing the highest development of the automatic brake plus the feature of electric control, the Electro-Pneumatic brake provides for instantaneous and simultaneous application of all brakes throughout the train, insuring short, smooth station stops and the shortest possible stops in emergency.

These are features which vitally affect the entire system of modern train operation in congested centers.

Electro-Pneumatic brakes not only save money; they point the way to increased earnings as well.

Westinghouse Traction Brake Company
General Offices and Works: Wilmerding, Pa.



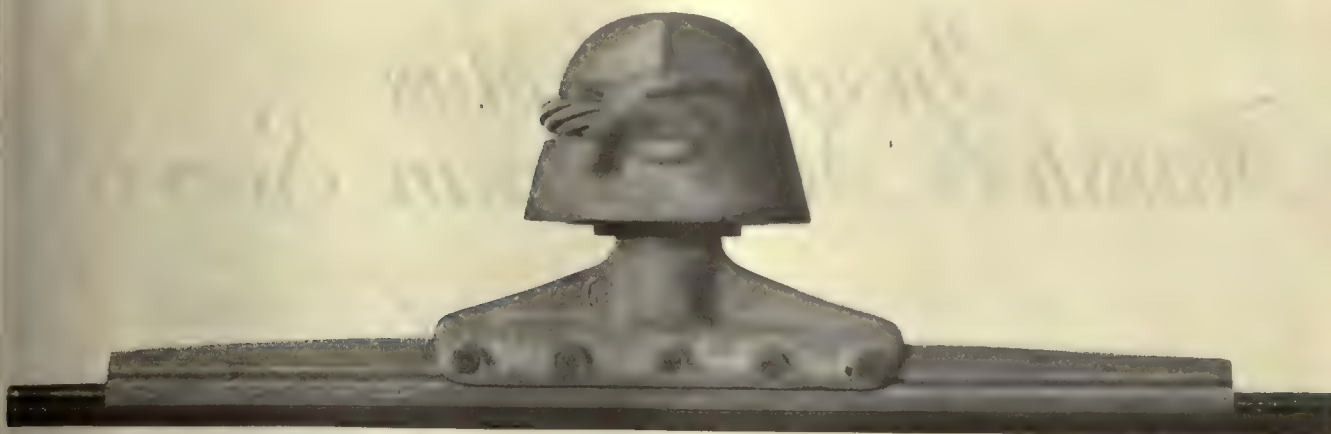
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WESTINGHOUSE TRACTION BRAKES



O-B Extruded Ear—Patented

An extruded brass runner on which is clinched and riveted a sherardized malleable iron boss.
Boss threads are filled with grease at the factory.

Grooved trolley wire needs O-B Extruded Ears

Clinch an O-B Extruded Ear on grooved wire and it is there to stay.

Absolutely accurate in contour, the lips fit into the groove exactly. The metal is tough, dense, tenacious. It hangs on. It resists wear.

These qualities are natural results of the extrusion process. Brass—red-hot and not molten—is forced through a die under enormous pressure. Denseness, toughness, strength and accuracy are literally squeezed into the metal.

Grooved trolley wire especially needs the compact strength of O-B Extruded Ears. They have made wonderful records for long life on all styles of wire.

Look in Catalog No. 18, pages 323 to 327.

O-B Extruded Ears
installed on wire
Notice the close fit and
good wheel clearance.



The **Ohio**  **Brass** Co.
Mansfield, Ohio, U.S.A.

New York Philadelphia Pittsburgh Charleston, W. Va. Chicago Los Angeles San Francisco Paris, France
Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators

Insurance plus Marsh & McLennan Service

OTHER THINGS BEING EQUAL—Marsh and McLennan would not be carrying the insurance for a great number of the largest public utilities in America.

The public is no more interested in where you buy your insurance than they are interested in where you buy your rails or cars or other equipment.

Marsh and McLennan solicit your insurance solely because they can render you a service that will decrease your insurance costs.

On one large eastern Corporation, for example, we were able to reduce the insurance rate from \$17.50 per thousand to \$4.30 per thousand. Why not buy your insurance where you can buy the most for your money?

We will be glad to outline this service to business executives who are interested in reducing insurance costs.

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KEYSTONE CAR SPECIALTIES

Illuminated Destination Signs

Steel Gear Cases

Motormen's Seats

Faraday Car Signals

Lighting Fixtures

Golden Glow Headlights

Headlight Resistances

Air Sanders

Trolley Catchers

Shelby Trolley Poles

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International Fare Registers

Fare Register Fittings

Samson Cordage

Air Valves

Cord Connectors

Trailer Connectors

Automatic Door Signals

Standard Trolley Harps

Standard Trolley Wheels

THE fingers of both hands would probably exaggerate the number of railway properties operating cars not equipped with Keystone Car Specialties. Some of the products herein enumerated will be found on nearly every car operated today. Look around and you will particularly note that Keystone-Hunter Illuminated Destination Signs, Golden Glow Headlights, Faraday High Voltage Car Signal Systems, Safety Car Lighting Fixtures and Keystone Steel Gear Cases are the rule rather than the exception. Operators prefer them and car builders approve the choice.

Ask for the respective data sheets

ELECTRIC SERVICE SUPPLIES CO.

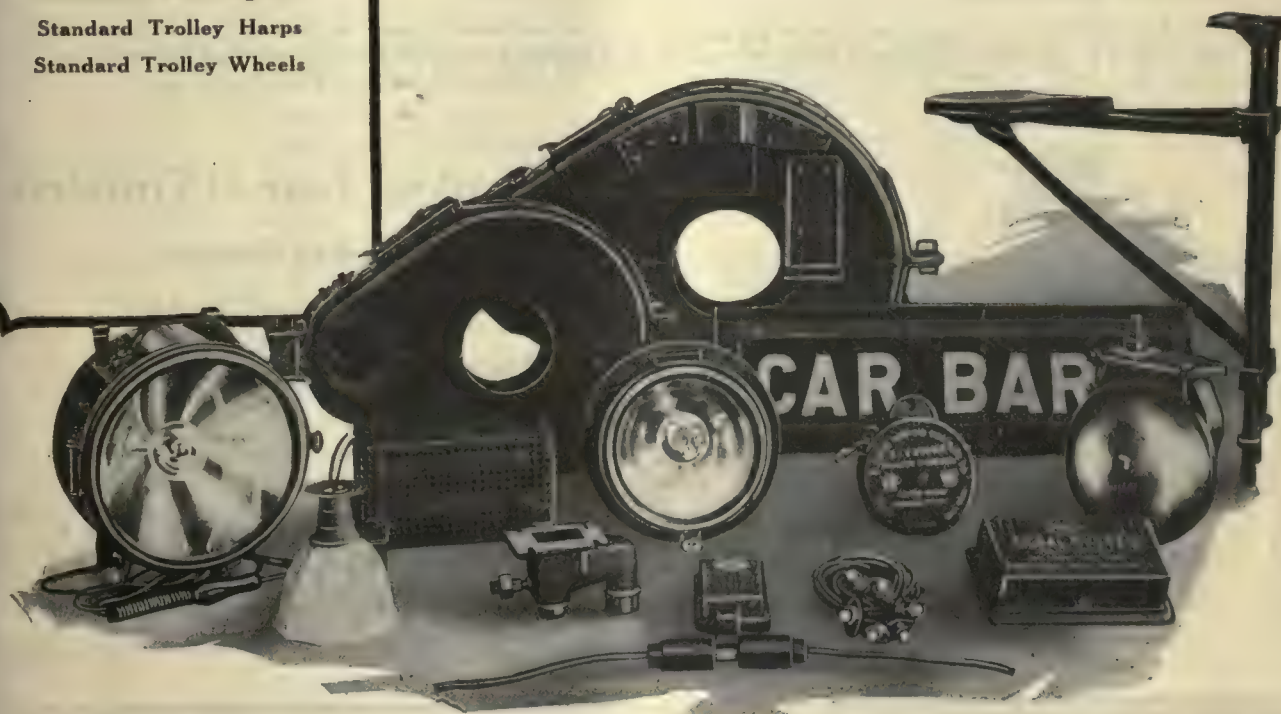
Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA NEW YORK CHICAGO
17th and Cambria Streets 50 Church Street Monadnock Bldg.

Branch Offices: Boston, Scranton, Pittsburgh

Canadian Distributors:

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver





Ajax Electric Arc Welder

Let's Go

into the question of welding

What are the vitally important features a railway man demands in his choice of welding equipment? Are they not, first of all, sufficient amperage to make a deeply-penetrating weld under any conditions, and next, low cost of handling and maintenance?

The Ajax Electric Arc Welder

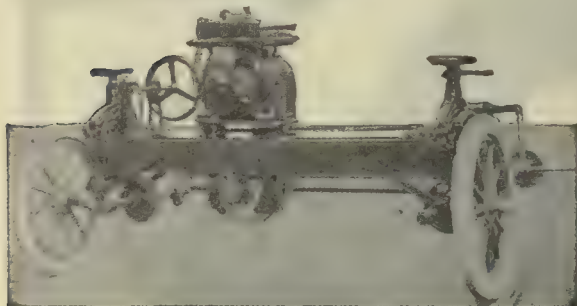
— *meets all these requirements*

The highest capacity welder of its class. Its normal rating is 333 amperes at 600 volts; where the line voltage falls as low as 300 it still gives over 200 amperes. Thus a deeply-penetrating, firm and solid weld is certain under worst conditions.

The Ajax Welder is so rugged and simple in construction that any reasonably intelligent work-man can be taught to operate it efficiently and rapidly. It is so

light that two men can pick it up and carry it anywhere. In case an accident damages a coil anyone can install a new one quickly. There's nothing else to get out of order!

Its usefulness extends to bonding, welding fish plates, building-up cupped joints and broken special work, repairing castings and in general shop work.



Universal Rotary Track Grinder

A Leading Line of Grinders

Atlas Rail Grinder

Reciprocating Grinder

Universal Rotary Track Grinder

Send for catalogues.

RAILWAY TRACK-WORK COMPANY

3132-48 E. Thompson St., Philadelphia, Pa.

AGENTS:

Chas. N. Wood Co.
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Modernize!

!

Pneumatize!

That "flying-leap" passenger!

You can't get rid of him.

Nor do you want to!

Because his objects are truly worthy ones—namely—to save a few seconds time for himself and deliver to you an extra fare!

But—you can make your car safe for him—so safe that there will be no possibility of trapping him in doors or steps.

—and at the same time you can do this without putting any burden of watchfulness upon your conductor or in any way distracting his attention from the main issue of getting all the fares—when you equip your cars with the

National Pneumatic "Rushhour" Line

Door and Step Control

Door and Step Operating Mechanisms

Motorman's Signal Lights

Safety Interlocking Door Control

Multiple Unit Door Control

In such cars, the entire control of doors and steps and go ahead signals are vested in the mere turn of a lever-handle or the pressing of a button. From the lone "flying-leaper" to the massed formation of

the rush-hour you can eliminate accidents and secure the utmost in revenue, on cars that are modernized — *pneumatized*. Think it over.

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

National Pneumatic Company, Inc.

50 Church St., New York

Edison Bldg., Chicago

Works: Rahway, N. J.

TIE SERVICE



(Recent photograph showing creosoted pine ties supplied by this company in track, New Orleans Street Ry. since 1899)

International Creosoted Ties still in track after twenty-three years' continuous service and good for many years more.

Quick shipments from seasoned ties in stock

CREOSOTED

POLES

PILING

TIES

TIMBERS

INTERNATIONAL CREOSOTING AND CONSTRUCTION CO.

General Office: Galveston, Texas

Plants—Texarkana—Beaumont—Galveston, Texas

"ONCINAWILE"

Being a Letter From a Motorman to His Friend George Who Has Left Railroading to go to Farming

East St. Louis, Feb. 16th, 1922.

Dear George:

It seems like it was just a short time ago since you was ring-dinging to me from the back end of old 600. But when I was looking back at my time cards, George, I see it has been over nine (9) months since you wrote time cards with me.

A lot of water has gone under the bridge since then George, and a lot of things has happened. I got a new uniform and cut my thumb on the star on my eating tobacco, and bumped smack into a guy with a load of coal at the bottom of the viaduct. He tries to cross the street in the middle of the block, and the track's greasy, and there we are, or was. And you know George I don't like to write accident reports.

There's something else happened, too, George. I wished you had been here, because you always was poking around trying to find out what made the car go.

They've put a meter on the car what measures the juice it takes to make it go. It's a right nice looking iron box with some figures on it to tell you how much you take, and a black thing in it that goes around when you use the juice. And, George, you ought to see it go when I'm getting up on the bridge. And they've been telling us how to do it, and not make that hand go so fast. You know, George, I've been running cars a long time, and when they first put these things on, I guess maybe I told them so and if they thought they could tell me anything about running a car, they've got another think coming. But they keep on talking and the boys got talking too, and I had to hear it or put cotton in my ears, and you know a motorman can't go around all day with cotton in his ears.

Well the first thing they tells us was that every time that little black ding-bat went around once it meant that the guy at the power house spit on his hands and shoveled in five (5) pounds of coal. He's no particular friend of mine George, so that didn't bother me much till I got home and was fixing the furnace and I put a shovelful in and looked at it and looked at the coal pile and I did a little figuring on the side of the coal bin, and I just had a ton put in, and I'll be darned if that car wouldn't only run 600 a day, counting what I was using and what Bill was using who relieves me, as you remember George.

Well, then they told us that when we are feeding her up we ought to stop on each point, but keep on going, and I had to laugh when I think how Bill just shoves it right around, and old Mike goes to sleep on each point. Here they both were wrong and I was just about right, because you know I keep my stepping.

But they got me on one thing, George. You remember that time we was ahead of time, and I was loafing along on seven (7) points, and you came up and told me something was getting hot. And we stopped and got out and looked and those things under the car was smoking. George, we sure was wasting juice. That's what made those things so hot. Well, that's what they told us, not to run on resistance points.

They was one thing they told us that sounded mighty reasonable. And that was to run on half speed when we had a buck traffic, because they said you didn't use so much juice, and you don't stand so many chances to hit something.

And I noticed that the ding-bat on the meter don't go near so fast when I'm running at half speed.

Then they told us a lot about coasting and that when we was coasting we was getting something back we already paid for. And if that pit man would keep my brakes so they don't and so hard, maybe I'm not some little coaster, George. You remember the time I bumped into Ed on 272. They'll never



catch me again like that, 'cause I lay back from anybody ahead of me now, George, and coast along and then if they stop sudden, like Ed did, I don't bump into them, 'cause I got lots of room to stop. And if they don't stop I just keep coasting along, saving juice and giving that guy at the power house a vacation, even if he isn't any particular friend of mine.

But when they got talking about braking I sets up, because I thought I just about invented the air brakes. They tell us not to fan the air, which is O. K. with me and then they tells us to use only one application for stops, and right away I set back again, because you know George, I never did believe in that one application stuff. And, George, I'll be darned if the instructor didn't come out and ride with me and show me about it. And he said he knew I wasn't braking right, because I used so much power. That had me guessing for a long time, George, how he could tell what I was doing with my brakes, just because I used a little more juice than the rest of the gang. But after he told me about how if you put too much juice into the car you got to take it out by the brakes, and likewise backwards, that is, if you take out too much with your brakes you got to put more in with the controller, then I begins to try this one application stuff, and believe me George, I'm some little one applicationer now.

Then, George, they got talking about how the conductor can help save power, by giving good snappy bells. I was wishing then I had you back on the back end, because you never was asleep on your feet like some people I could mention.

Well, George, they put up a list showing us how much juice we was using, and here I was at the bottom of the list, and I just stayed there till that fellow came out and told me about my air like I told you already. And now I'm batting third or fourth but there's a couple of fellows I can't head-off. I guess it's like playing pool, George. You always could edge me out no matter how hard I tried.

I hope everything is going O. K. and that the cow you had sick is better now. Tell the Missus I still slow down at the corner on the supper trip looking to see her come running out of the house with your dinner pail.

Your old pal,
Jerry.

Courtesy "Oncinawile" Company publication of East St. Louis & Suburban Ry. & Lt. Co. users of

ECONOMY POWER SAVING METERS

Sold by

Economy Electric Devices Co., Chicago, Ill.



One-half of a single-track crossing constructed by means of Thermit welding for Omaha & Council Bluffs Street Railway, Omaha, Neb.

Thermit Shop-Built Frogs **\$60** Cost Only About

Although this cost for a square frog is only a fraction of that of solid manganese and manganese hard center special work, the long life of Thermit-welded frogs and crossings has been conclusively proved again and again by many installations which have held up admirably for years under heavy traffic.

The earliest Thermit frog ever installed is still in perfectly satisfactory condition after over six years of service in a large middle-Western city.

Any damage to the points can be repaired at minimum expense by the addition of metal by means of the electric welder.



Let us send you a Thermit outfit at once and let our experienced track engineers instruct your men in constructing a Thermit crossing by using simply the rail which you have on hand, your own track labor and the Thermit outfit and materials.

Send for our Rail Welding Pamphlet 3932.



Metal & Thermit Corporation

120 Broadway, New York

PITTSBURGH

CHICAGO

BOSTON

S. SAN FRANCISCO

TORONTO





In this installation at Miami, Fla., a single line of Bates Expanded Steel Poles carries trolley wire, feeders, transmission lines, telephones, and ornamental lighting brackets.

The appearance of this line, in a neighborhood where appearance counts, is superior to other types of pole line construction, and besides the good will value, this line costs less than any other type, including wood pole lines.

Note that all the surfaces of the pole are readily accessible for painting. A coat of paint at intervals is the only maintenance required.

The Public You Serve Is Your Judge

Of all the property of a utility the pole lines come most before the eye of the public — the public whose good will is vital from every point of view.

The appearance of a Bates Pole line is an asset. The trim, smart appearance remains with age. Every Bates Pole is symmetrical, obviously sturdy, and yet unobtrusive. Their clean lines often permit the use of a heavily loaded line in places where any

other construction would be an eyesore.

An investment in a Bates Steel Pole line remains through a long life at par. Its value does not fluctuate, is not subject to heavy depreciation charges. Bates Poles will be standing a generation after a wood pole line has come to the end of its life.

And, the Bates Steel Pole first cost is now below that of an equivalent wood pole, (not to say other steel types).

Bates **E**xpanded **S**teel **T**russ **C**o.

208 South La Salle Street, Chicago, U. S. A.

District Sales Offices in all Principal Cities.

Send for the Bates Steel Pole Treatise if you are not familiar with Bates Poles. Or, consult our engineers if yours is a special problem.

BATES *ONE PIECE* **EXPANDED** **STEEL POLES**

Sliding Shoe a Better Collector*

BY C. M. BANGE

Master Mechanic Interstate Public Service Company, Scottsburg, Ind.

MY PAST experience with the sliding contact shoe has consisted merely of several tests to determine if a saving could be made by its use, which test at that time did not make the showing expected. Since coming to the Interstate Public Service Company, I find the sliding contact shoe filling the place of the trolley wheel where the current carrying capacity is the prime factor required. This the sliding shoe successfully performs while the trolley wheel proves a failure. When under headway our limited cars draw approximately 400 amp. and

*Abstract of discussion on "Merits of Sliding Contact Shoe" at the annual convention of the Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

The
Interstate
Public Service Co.

uses

MILLER TROLLEY SHOES

Here Are Some Comments

Perhaps you didn't read Mr. Bange's entire paper presented at the C.E.R.A. Meeting and printed in the Electric Railway Journal. Here are a few quotations which will interest you:

"It was found that . . . a standard 8-in. trolley wheel would build up in the groove instead of wearing away. Difficulty was experienced in keeping the wheel on the wire. A wheel . . . very soon becomes out of true and causes a drumming noise. . . ."

"The sliding contact shoe overcame all these objections: arcing at wire is hardly noticeable even on a dark night; speed has very little effect on its sticking to the wire. . . ."

"From a mechanical and electrical standpoint the sliding contact shoe seems nearly perfect. . . . As the shoe does not revolve, it is possible to connect it directly to the harp with a shunt, thereby eliminating all pins and bearing trouble."

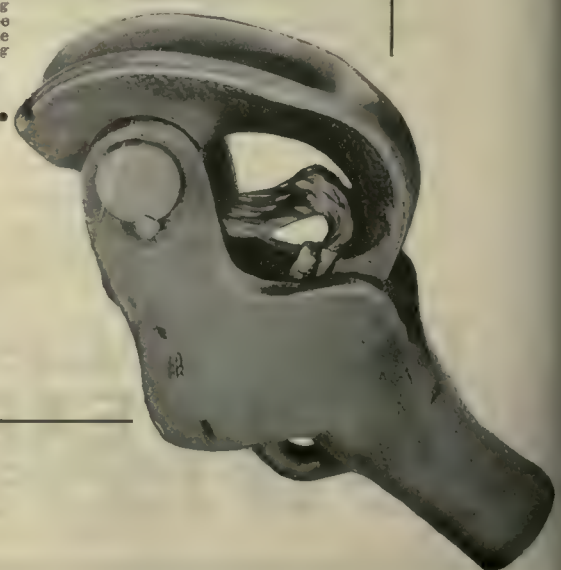
"There are fewer parts to maintain."

"And a careful inspection of the trolley wire has shown no undue wear from the use of shoes."

Isn't this worth trying out?

Write Us!

Miller Trolley Shoe Company
Boston—21, Mass.





Why trolley cars grind their teeth



Of course trolley cars have teeth—gear teeth. And unless they are properly taken care of, trouble and expense follow.

Also, like human beings, about four out of every five suffer from lack of care—at least until someone learns the right way.

The chief reason for the premature wearing out of gear teeth is that they get the wrong kind of lubricant:—

A. One that is *too thin*

B. One that is *too heavy*

The "A" kind leaks out of the gear box (which is never too tight after any amount of service), or is splashed around on the **inside**, and there is really no point to putting lubricant on the walls of the gear case.

The "B" kind drops to the bottom of the gear case and after a while the gears just cut a channel through it, and so run nearly dry.

And what is just as bad, such products hold in suspension dirt and particles of worn metal producing a very appreciable abrasive effect.

What's right then?

Plainly stated—the answer is—

The Direct Application of Texaco Crater Compound.

And records drawn from hundreds of thousands of car miles prove it.

Here's how it works—

A small quantity of Texaco Crater Compound is put directly onto the uppermost gear teeth.

A few revolutions and all the teeth of all the gears are coated with a protective film of Texaco Crater Compound.

This film is enough for perfect lubrication. It checks wear.

It doesn't hold chips or dirt.

It doesn't fling around the casing.

It stays on the job—on the teeth—for a long time.

When the car is inspected, your men notice the condition of the gears and, if required, they add a little lubricant.

This method has proven itself the most effective and economical.

And you don't waste lubricants—yet you save gears.

Just say "DEMONSTRATION"
—select one car—or a dozen—they will stop grinding their teeth—Texaco Crater Compound will show the way.

There is a Texaco Lubricant for every purpose
Rolling Stock, Power Plant, Substation everywhere.



THE TEXAS COMPANY
DEPT. R-J, 17 BATTERY PLACE, NEW YORK CITY
HOUSTON - CHICAGO - NEW YORK
OFFICES IN PRINCIPAL CITIES



"Tool Steel" Quality T. S. Q. "Tool Steel" Quality



White paint illustrates softened end of teeth on motor side of pinion. This eliminates chipping. (Patent pending)

"Tool Steel"

HELICALS

are just as superior
in quality as

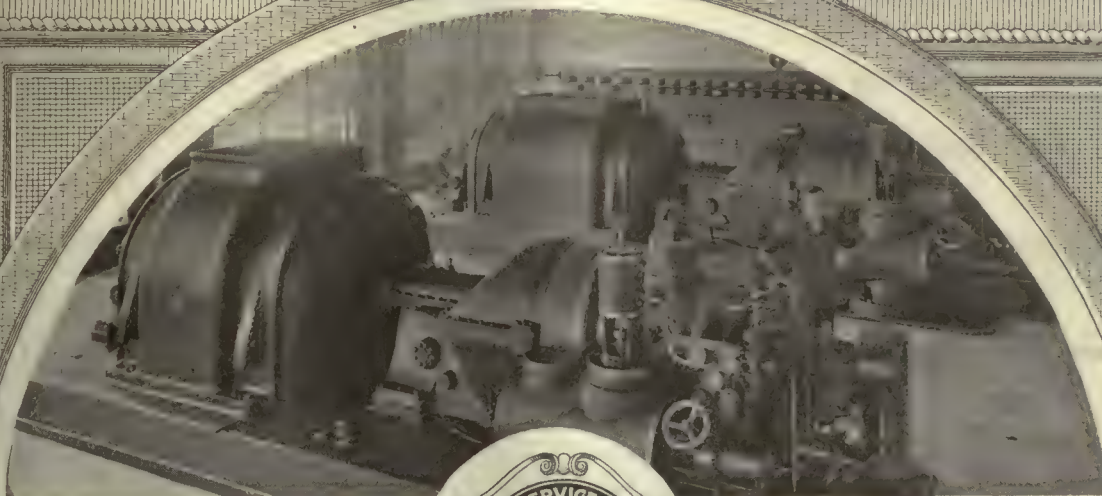
"Tool Steel"

SPURS.



"Tool Steel" Helical gears—in sets, or interchangeable with other makes.

"Tool Steel" Quality T. S. Q. "Tool Steel" Quality



Galena Turbine Oils

Made from specially selected stocks that are marketed only by this company. Purest of straight mineral oils, filtered, non-emulsifying and free from acid.

Galena Turbine Oils — light, medium, heavy — and Galena White Turbine Oil must, from the crude to the finished state, conform with Galena Quality specifications. Suitability for the work required is the first consideration.

These oils are giving exceptional service on both unit and gravity systems in turbine lubrication and the lighter grades have demonstrated the value of oil quality, where used in high speed light turbines, reciprocating engines and fast running machinery of all kinds.

*In the world of lubrication Galena Quality
is always interpreted as "The Best."*

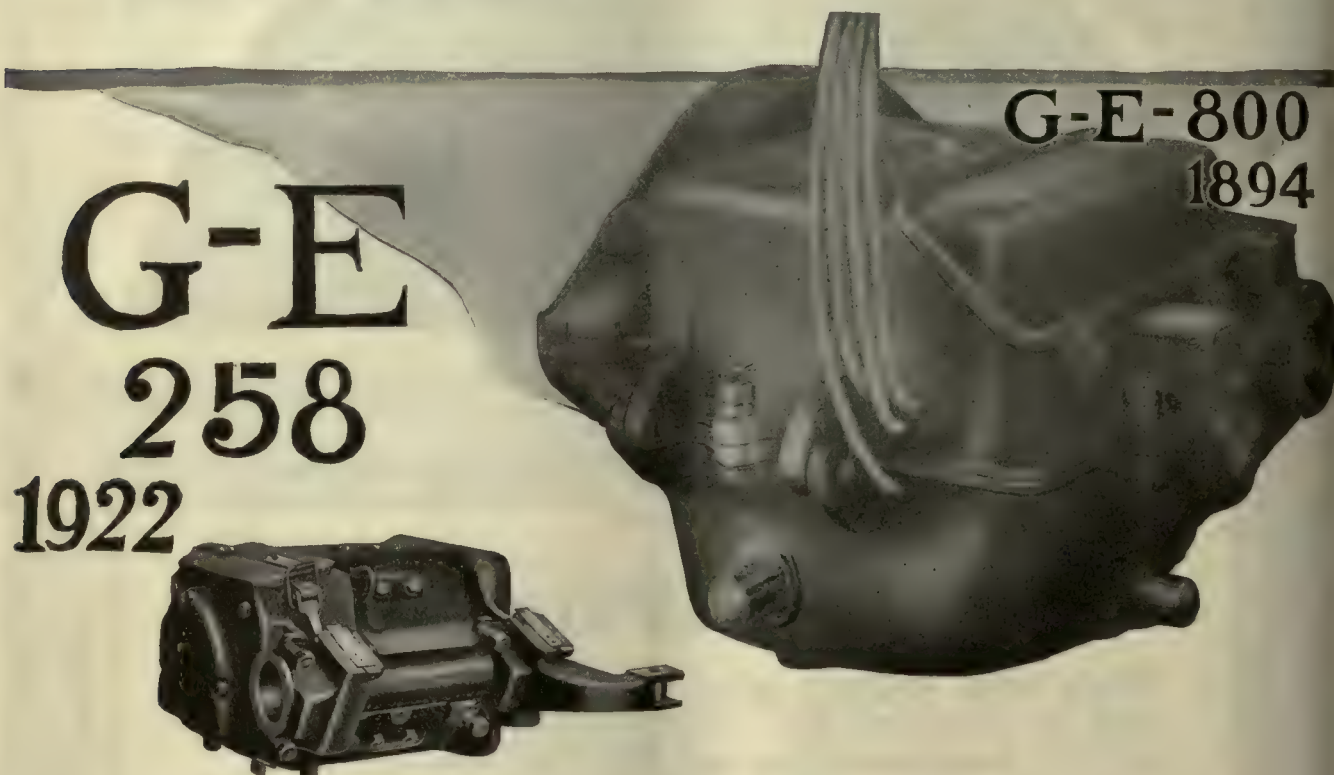


Galena-Signal Oil Company

New York ▾ Franklin, Pa. ▾ Chicago
 ▾ and offices in principal cities ▾



The spirit of true leadership is not merely to get to the front but to stay there



Yesterday and Today in Railway Motors

The GE-800 of 1894 weighed 1930 pounds, which was at that time a comparatively light-weight motor.

The GE-258 motor of today weighs but 885 pounds and is capable of as much work as its distant predecessor.

The old motor was fully enclosed and had no commutating poles, whereas the self-ventilation and commutating poles of the GE-258 give it so liberal an overload capacity that it has become the favorite motor for safety cars and light-weight interurban cars where schedule speeds combined with maximum reliability are controlling factors.

General  **Electric**
General Office
Schenectady, N.Y. **Company** Sales Offices in
all large cities

ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

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Volume 59

New York, Saturday, April 22, 1922

Number 16

Purchase of Detroit Lines Approved by Voters

MAYOR COUZENS of Detroit will soon be free to put into full effect his idea of how best to run a municipal street railway. At the election there on Monday the voters cast their ballot to sustain him in his effort to municipalize the entire city system. The Detroit United city lines will be taken over at the price of \$19,850,000, to be paid with a down purchase of \$2,770,000, the rest of the price to be paid in installments. The present municipal system will now be tied in with the lines which the Detroit United has been operating, and the United States will witness the most important experiment in municipal ownership of a city railway system so far made in this country.

Jim Couzens is a big man. He has a genius for getting things done. The wisdom of his ways may be open to question, but there is no controverting the fact that the work of building the municipal road so far constructed during his administration of affairs in Detroit has been carried out with celerity. While he is in office his best efforts will undoubtedly be devoted to the careful management of the road along sound lines. But Jim Couzens is an anachronism in American public life. When the day arrives that he goes out of office Detroit's troubles will begin in earnest. For if Detroit runs true to American political form the likelihood is very remote of that city electing as his successor a man with other his qualifications for office or his determination. It is here that danger lies ahead for Detroit.

One Fare Surely Hasn't Hurt San Diego Building!

ONE of the most common and plausible arguments urged against the graduated fare is the real estate man's assertion that it is a sure way toward congestion. Of course, what is worrying Mr. Realtor is that the electric railway charges a higher fare to the long-haul riders he himself will be deprived of some earned increment on his land. Be that as it may, San Diego is furnishing an emphatic denial of the congestion argument.

It will be recalled that on Jan. 1, 1920, the San Diego Electric Railway inaugurated a zone fare system in which a universal 5-cent fare was succeeded by a basic fare of 5 cents for either of two zones (inner and outer), while a two-zone ticket could be bought for 7½ cents. The new system was a success from the first, judged by the fact that both revenue and riders increased appreciably.

Now comes a review of really developments in San Diego during the first two years of the zone-fare system. According to the San Diego Union for March 19, 1922, the number of permits for new residences in 1920-21 was 285, against 242 in 1918-19, an increase of 431 per cent. The value of these new residences was placed at \$3,232,000, against a value of \$724,500 in 1919, a gain of 346 per cent. In January and February of 1922 activity

has become even greater, January showing 131 permits for \$322,900 of buildings and February 130 permits for \$337,025 worth.

These are large figures for a city of 80,000 population. But what will interest the electric railway man most is that about 90 per cent of the building activity in 1920 and 1921 occurred within the outer or 7½-cent-10-cent zone, a fact which is all the more significant because San Diego is a most diffused city with more than one vacant lot at its very core. It may well be that our real estate brethren have had to sell these outer zone lots for a bit less than if they were reachable by a 5-cent fare, but the record to date surely shows that the congestion argument, so far as San Diego is concerned, is all moonshine.

The Railway Vocabulary Is Enriched

WHEN a great need develops in the industrial field, some inventor usually rises to the occasion and produces the device or machine required. It is the same with the English speech. If there is a real demand for a word or phrase to express an idea, it will be coined by some one and become a recognized part of the language. A notable instance was the word "inter-urban" as applied to an electric railway joining two cities.

Last week another expression was first used to describe an electric railway condition, and it promises to be so useful that it also will probably become a part of the electric railway vocabulary. The occasion was a hearing on car loading and service conditions before the New York Transit Commission, the particular point being to determine the number of passengers who had seats during certain hours and those who were obliged to stand.

In most cases of this kind, the presumption to which such testimony leads is that those who stand because they cannot find seats undergo a hardship. The management of the railway company, however, pointed out that, during a large part of the day at least, such passengers suffer no real inconvenience, because they do not have to stand for any considerable length of time. The reason for this is that so many people leave the car at each station that during the non-rush hours most passengers can secure seats after riding a few blocks.

To this class of passenger the representative of the company applied the term "rotary standees." A "rotary standee" may then be defined as a passenger who cannot find a seat the moment that he enters the car, but who within a short time will be able to seat himself in the place made vacant by a departing passenger.

Standees, in railway parlance, can therefore be classified in three ways. First, there is the standee who might be termed the compulsory standee or long distance straphanger. Next comes the rotary standee, whose status has just been defined. Finally, comes the pas-

senger who stands by preference, either because he prefers an open rear platform to a seat in the middle of a car which he may have to occupy with some disagreeable companion, or because he has baggage which he does not care to take into the car, or because he boards the "car ahead" when there is a vacant seat for him in the car behind, or for some other reason.

It is, of course, generally admitted that railways in large cities cannot supply a seat to every passenger during rush hours, and often not at other times. Even if they could afford to do so, in most cases it would be impracticable because of the impossibility of operating so many cars on the street. Where it is possible it would cost so much that it would greatly increase the average cost of a ride.

Nevertheless, the public should realize that every standee is not what might be described for the purpose of this discussion as a standee by compulsion.

Why the Increasing Interest in the Rail Car?

THERE is something about the rail car, or automotive bus with flanged steel wheels, that appeals to the imagination of the steam railroad and electric railway man. A self-reliant, self-propelling vehicle that can be set on rails anywhere and is immediately ready for business is a transportation tool not to be despised.

Of course the principal field for the rail bus is on light-traffic steam railroad lines or for supplementary local passenger service on steam lines which are primarily devoted to through freight and passenger business. Under such conditions it is necessary to operate steam-locomotive-drawn trains at very low load factor, or to stop through trains at frequent intervals to furnish necessary local service. The flexibility of the rail car adapts it well to such use. Operated in single units it insures a quality of service which will not only care for existing business cheaply but will develop new business.

Obviously the opportunity for this vehicle on steam roads is sufficient to stimulate, through competition, the perfection of its design and construction. The electric railways will profit by this, for while they, even in the aggregate, cannot use many rail cars, they can use some. In the evolution of a new interurban project rail cars might well be employed during a certain period, while traffic is building up. The same is true on roads whose traffic has lightened to an uneconomical point, or whose expected traffic has never materialized.

Granting all of this, one naturally inquires why the rail car has only recently aroused widespread interest. Steam "dummies" were of course used with some success many years ago, but were discarded in the progress of the transportation art. Why take a step apparently backward? This query ignores the fact that the automobile and the automotive bus have in the meantime taken the country by storm. More important yet is the fact that the robust and foolproof truck motor has been made available for the rail car through hard service in a closely allied field. In addition, the hard times in the transportation industry have driven home the fact that its facilities must be co-ordinated in order to move people and goods with facility and economy.

Transportation men are waking to the fact that old equipment and old methods will not pay dividends under modern conditions. Hence, once assured that the rail car is reliable and durable they will use it.

Augusta Learns a Costly Lesson

AUGUSTA has seen the error of her way. After the city had struggled along for a month without electric railway service the city officials met the company's representatives in a spirit of give and take and conceded the attitude of the company to be right, that two systems of transportation cannot exist in active competition on the same street. The lesson was available to Augusta of the dire consequences of unregulated jitney competition in Des Moines and Saginaw, but Augusta, it seems, had to learn at first hand.

From the standpoint of the city, the whole proceeding was a disgrace. The Council had been warned sufficiently in advance of the direction in which events were heading. So far as the members of that body are concerned, the charitable thing, of course, would be to conclude that the Councilmen must have been cognizant of the ultimate result of their attitude, but that they felt called upon to make a demonstration against the railway so as to placate the jitney interests. If this is so, then the city has paid a frightful price in the name of political expediency.

For the company there was nothing else left for it to do but to shut down. In resuming service it has done so apparently against its best judgment and without securing the full measure of protection against the jitneys that would appear to be warranted under the circumstances, but it has returned the cars to service in a spirit of helpfulness, hopeful that the public will respond with a measure of patronage that will permit it to continue operation uninterruptedly. The company is not against the jitney, or jitney service. Its contention all along has been against unfair competition, unfair as manifested most strikingly by the operation of two lines of transportation service on the same street. It ought not to take long to demonstrate whether the measure of regulation under which the cars have been returned in Augusta is sufficient to afford the company the degree of protection necessary for it to operate successfully in the future.

What Do You Do with a Complaint?

ONE electric railway executive who has made a conspicuous success of his interurban railroad never lets a complaint go by as inconsequential. To him every complaint is a matter of important concern. Every complaint represents evidence that the service is not as good as it could be and he takes steps to determine how the cause of that complaint can be removed. His constant endeavor is to do everything possible to cater to the comfort of the passengers. No effort or expense is spared in seeking improvements. Perhaps the worth of this way of treating complaints can be judged by the fact that in the last four years the passenger traffic on this line has increased 40 per cent, the passenger revenue 150 per cent and the freight revenue 1,000 per cent, despite the direct competition of one of the best steam railroads in the country. Of course this policy and effort in connection with complaints is only one phase of a very broad and intelligent program of developing the line and building public esteem, all of which has a bearing on the growth of the business handled. But it bespeaks the general attitude of the whole organization toward the public and the result speaks volumes as to the wisdom of the policy.

Electric Locomotives for Chile Freight Service

Details of Road and Switching Locomotives Soon to Be Delivered to Chilean State Railways Are Given
—Designs Provide for Incorporation Into Present Railway System While Not Preventing Further Standardization

BY F. E. WYNNE

Manager Railway Equipment Engineering, Westinghouse Electric & Manufacturing Company

THE initial electrification program of the Chilean State Railways includes fifteen freight locomotives for road service and seven for switching service. These are in addition to the passenger locomotives, of two types, described in an article in the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 25, 1922. The first ten cabs for the road freight locomotives have now been delivered by the Baldwin Locomotive Works to the Westinghouse company for the installation of the electrical and air-brake equipments. On account of the progress which is being made in the production of these machines some details regarding them will be of interest.

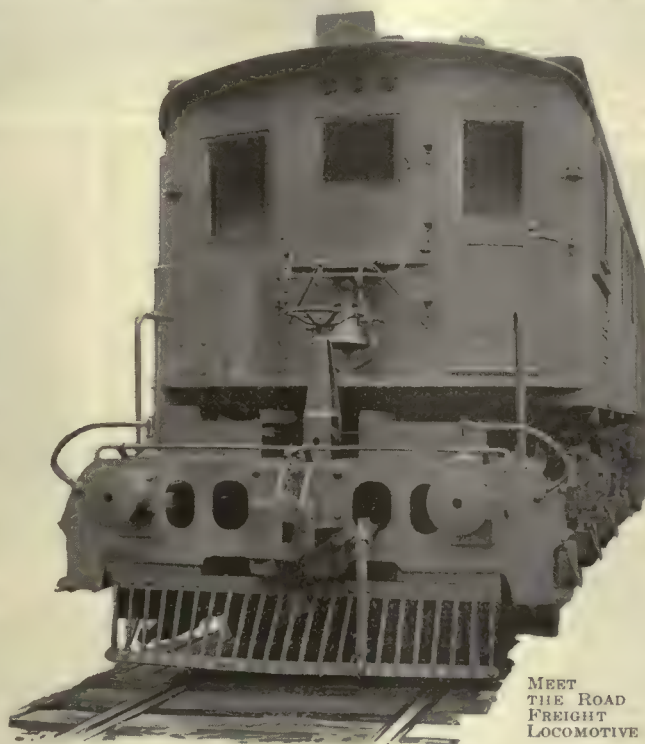
The service conditions under which the locomotives will operate were covered in articles in the issues of this paper for Dec. 3, 1921, and Jan. 28, 1922. They will be put into service on the main line between Santiago and Valparaiso, 116 miles, and on the branch line between Las Vegas and Los Andes, 28 miles. The heaviest grade is 2.25 per cent, 12 miles long against southbound traffic on the main line from Llai Llai to La Cumbre. In emergency or on holidays these locomotives may be used to operate express passenger trains.

ROAD LOCOMOTIVE SIMILAR TO THAT USED ON PAULISTA

In general design the road locomotive is similar to the freight locomotives furnished to the Paulista Railway of Brazil. The box-type cab is carried on two trucks, articulated, each having three driving axles with direct-gear motors. The estimated weight is 226,000 lb.

A low voltage will be generated on the locomotive for the control circuits, and the system of control is arranged for operation of the locomotive from either end and for multiple operation of two locomotives from any one controller. Regenerative braking also is provided.

The nominal rating of the locomotive is 1,680 hp. at 3,000 volts and the equipment is capable of developing a maximum of 3,200 hp. for short periods. With natural ventilation the locomotive will deliver a tractive effort of 27,950 lb. at a speed of 22.6 m.p.h. at 3,000 volts for one hour with a temperature of 75 deg. C. by thermom-



MEET
THE ROAD
FREIGHT
LOCOMOTIVE

eter on the main motors. The continuous capacity at 3,000 volts and with forced ventilation is 20,580 lb. tractive effort at 24.8 m.p.h. with a temperature rise of 65 deg. C. by thermometer on the main motors. With 25 per cent nominal adhesion the starting tractive effort is 56,500 lb. The maximum speed is 40 m.p.h. At loads corresponding to the short field continuous current ratings of the motors, running speeds of approximately 6.1, 8.1, 12.8, 16.6, 19.5 and 25 m.p.h. are available.

With any one pair of motors cut out, half of the locomotive capacity is available for starting and two-thirds for running.

The general dimensions and estimated weights of the locomotive are given in Table I.

The salient features of the cab and trucks and many of the details are clearly shown in the accompanying illustrations. The

Chilean freight cars now use drawhooks as in European practice. However, it is planned eventually to use M.C.B. standard drawbar equipment on the entire system. Consequently, these locomotives will be equipped with Continental spring buffers and M.C.B. couplers. The couplers are arranged to take attachments for chain couplers during the transition period.

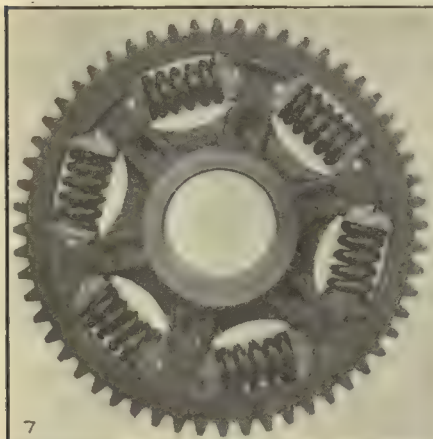
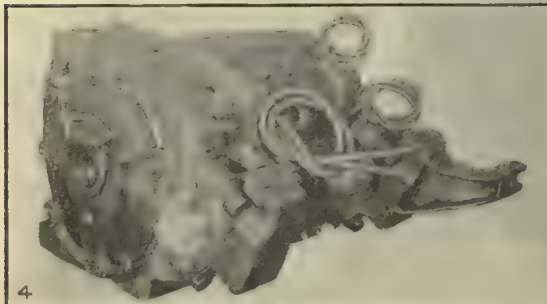
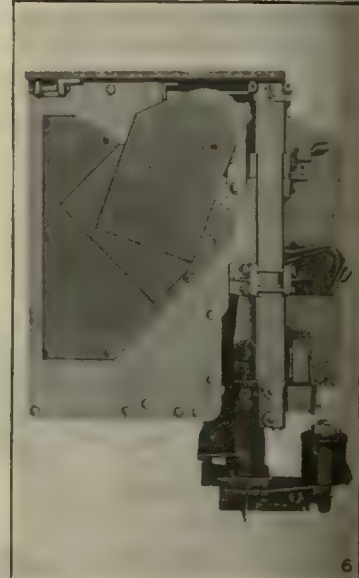
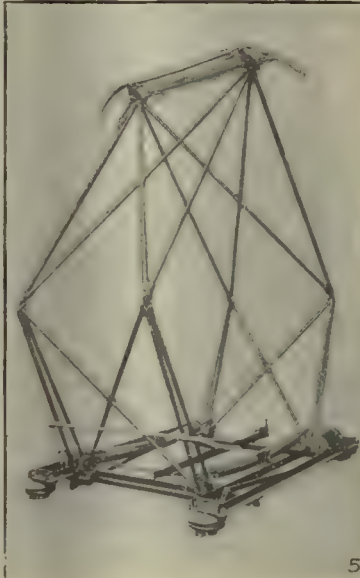
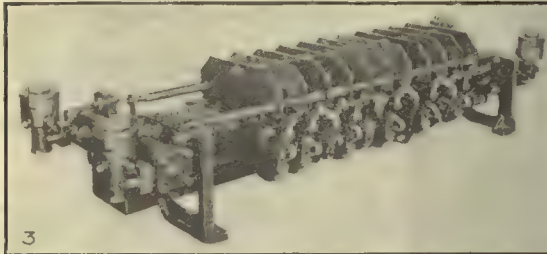
The articulation of the two six-wheel trucks at the inner ends is effected by means of a Mallet hinge. The bar-type cast-steel side frames are located outside of the wheels and are connected by cast-steel bumpers and cross-ties. The oil-tempered steel semi-elliptic driving springs over the journal boxes on each side are connected to one another by equalizing beams. The ends of each set of three driving springs connected thus are attached to the side frames through coil springs.

Rolled steel shapes extending the entire length of the cab and joined by cast-steel and rolled-steel cross members constitute the cab underframe. The cab is of the

TABLE I—DIMENSIONS AND WEIGHTS OF ROAD FREIGHT LOCOMOTIVES

Track gauge.....	5 ft. 6 in.
Length over buffers.....	49 ft. 10 in.
Length over cab.....	38 ft. 0 in.
Total wheelbase.....	37 ft. 0 in.
Rigid wheelbase.....	13 ft. 9 in.
Height, top of rail to cab roof.....	12 ft. 7 in.
Height, top of rail to clerestory.....	13 ft. 10 in.
Width over cab sheets.....	10 ft. 0 in.
Height of coupler.....	41 in.
Wheel diameter.....	42 in.
Weight of complete locomotive.....	226,000 lb.
Weight of mechanical parts.....	140,000 lb.
Weight of electrical equipment.....	86,000 lb.
Weight per driving axle.....	37,670 lb.

Assembly View of Chilean State Railways Road Freight Locomotive and Some Details of This and the Switcher



Key to the Illustrations

No. 1—One of the Chilean road freight locomotives.

No. 2—The road freight locomotive trucks are articulated at the inner ends by a Mallet hinge and are equipped with M.C.B. couplers and spring buffers.

No. 3—Cam-operated switches are mounted on a single shaft connected through rack and pinion to a double-acting air piston.

No. 4—The motors are 280-hp. wound for 1,500 volts and insulated to operate two in series on 3,000 volts.

No. 5—Pantographs are spring-raised, air-lowered and mechanically locked in the lowered position.

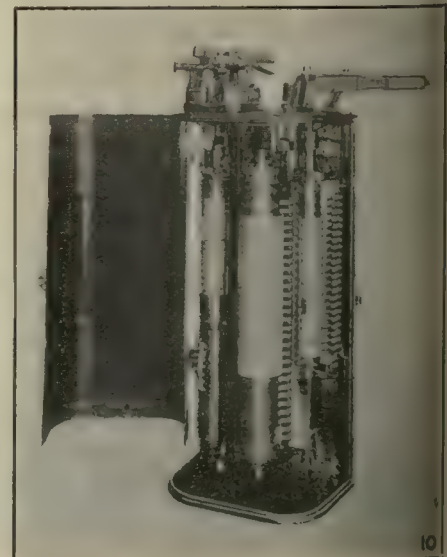
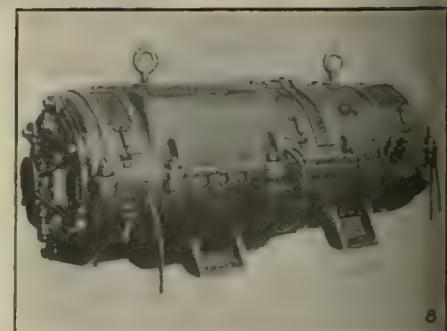
No. 6—One of the 3,000-volt unit switches.

No. 7—Type of flexible gear with which freight locomotives will be equipped.

No. 8—The 35-kw. motor-generator set which furnishes low-voltage power supply on the road freight locomotives.

No. 9—The master controller for the switching locomotives has two levers.

No. 10—The master controller for the road freight locomotives has four levers.



box type, 38 ft. long, and comprises an engineman's compartment in each end and a central equipment compartment. These compartments are separated by bulkheads, in which are doors at each end of each side aisle. The equipment compartment houses the blowers, motor-generator set, air compressors and most of the control equipment. The end doors are in front of the fireman's stations and there is a side door from each aisle. The usual windows, louvers and roof ventilators are provided.

The cab is carried on center pins located approximately over the midpoint of each rigid wheelbase. One center pin is restrained both longitudinally and laterally and the other in the lateral direction only. This permits longitudinal movement of the cab relative to one truck.

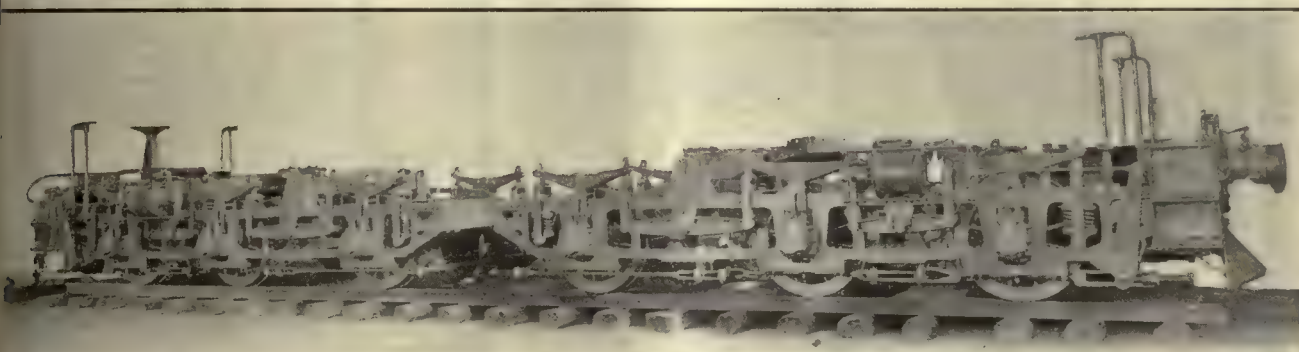
The locomotives are equipped with Westinghouse air brakes, which are already standard with the Chilean railways. The air brake is of the 14-E.L. type, which provides straight air for the locomotive alone and the automatic feature for both locomotive and train. This is of advantage in that the locomotive brakes may be applied either independently of, or in conjunction with, the train brakes.

The air brake is interlocked with the regenerative brake so that the latter may be supplemented by service application of the train brakes, if desired, without ap-

connected through a rack and pinion to a double-acting air piston. The application of air to this piston through the electro-magnetic valves rotates the camshaft, closing and opening the switches in the correct sequence. Each switch is closed by the pressure of a cam on a hardened roller and is opened by spring action. Each cam switch can be removed from its group without disturbing the other switches. These switches are without blowouts, except where they are required to open power current.

Each of the six axles of the locomotive is driven by a Westinghouse No. 350-D 1,500-volt series motor and insulated to operate two in series on 3,000 volts. The nominal rating of this motor on short field is 280 hp., at 155 amp. and 1,500 volts. Field control is secured by the use of two separate field windings on the main poles. During acceleration high starting tractive effort at low speeds is obtained with a current below normal by connecting these two main field windings in series. The full-field connection also provides an additional operating speed for each of the three motor combinations. For the higher operating speed in each combination, only one of the main field windings is effective. High continuous capacity is assured by the forced ventilation provided by two motor-driven blowers.

The motors are geared directly to the axles with a



TRUCKS FOR ONE LOCOMOTIVE ASSEMBLED AT LOCOMOTIVE WORKS

plying the air brake to the locomotive drivers. In case sudden stop is required during regeneration, movement of the brake valve to the emergency position cuts off the regenerative brake and gives an emergency application of the air brakes on both locomotive and train.

The pantograph trolleys provided for collecting the current from the overhead are of the spring-raised, air-actuated type, arranged to be mechanically locked in the lowered position. Each has two flexibly mounted shoes with hard-drawn copper wearing strips which can be readily replaced. One trolley is sufficient for regular operation. For safety and to facilitate cutting out a defective pantograph, a double-throw disconnecting switch is mounted adjacent to each trolley. This switch is arranged so that in one position it connects the trolley to the main switch and in the other position it locks the trolley down and connects it to ground.

The main circuit connections are established by a number of individual air-operated switches mounted in several banks, each switch a complete and removable unit in itself. The 3,000-volt unit switch is of the same general design as that which is standard for low voltage.

For certain combination switching where no current is broken and for low-voltage circuits cam-operated switches are used. These also operate by compressed air controlled by electro-magnetic valves. The cam group comprises a number of switches mounted on a single shaft

ratio of 3.94 to 1. The sixteen-tooth solid pinion of 2 diametral pitch is cut from a forged steel blank and treated. The sixty-three-tooth gear is of the flexible type, similar in general design to those which have been in successful operation on the Pennsylvania Railroad's Philadelphia terminal electrification for seven years.

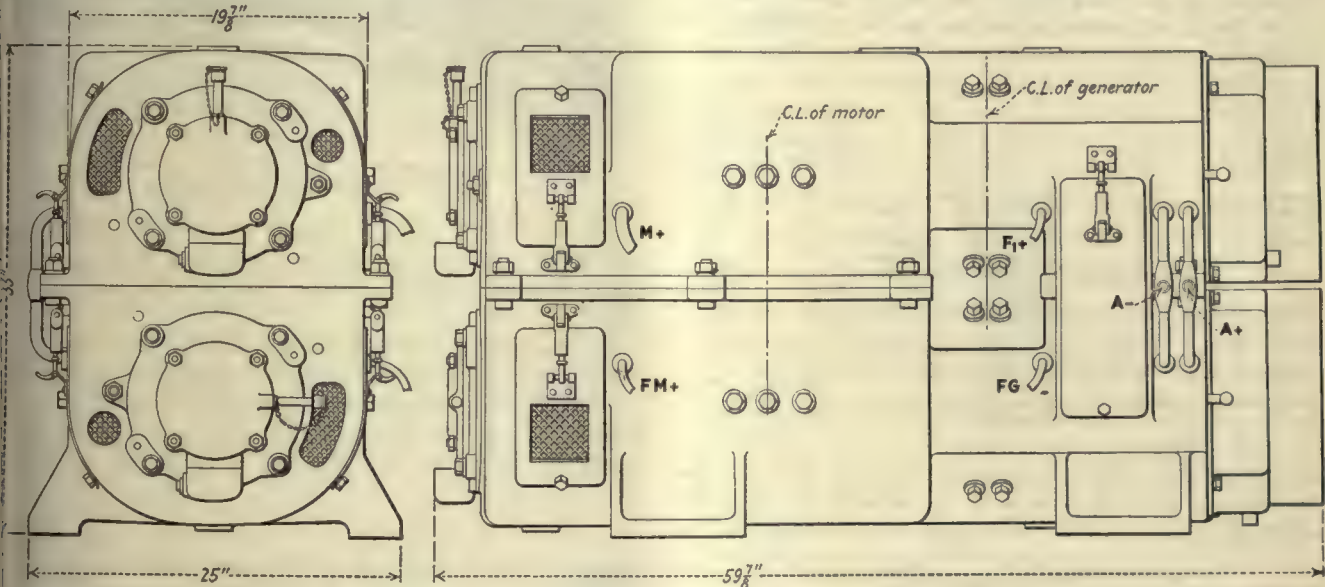
For low-voltage supply to compressors, blowers, control equipment and lights a motor-generator set is installed in the locomotive. This has a single frame and the two armatures are carried by a common shaft running in two bearings. The 3,000-volt motor is a bi-polar double-commutator machine. The continuous rating of the generator is 35 kw. at 92 volts.

To provide for double-end operation of the locomotive a master controller is located in each engineman's compartment, the same one being used for both motoring and regenerative braking. This controller has four levers: a reverse lever with forward and reverse positions; a regenerative lever with thirteen notches; a motor combination lever with three positions; a speed lever with sixteen resistance notches, one full-field notch, and one short-field notch. Altogether, fifty control notches are available in acceleration so that tractive effort variations are small, thereby permitting exceedingly smooth handling of trains. All levers of the master controller are thoroughly interlocked.

By means of the Westinghouse HLFRC control three

speed combinations will be obtained by varying the grouping of the motors. With all six motors in series one-third speed will result. Two parallel groups, each comprising three motors in series, give two-thirds speed. On full speed three groups, each of two motors in series, are in parallel. All motor main fields are connected next to ground, the voltage stresses on the field windings being reduced thereby. The double-field winding on the motors, giving a full-field and a short-field position for each motor combination, provides a total of six running speeds. Transition from one motor combination to another is by the shunting method.

For regenerative braking, the main motor armatures are arranged for the same combinations as when motoring, and the motor fields are separately excited by the motor-generator set. The arrangement is such that the same voltage is impressed on all field circuits. This tends to produce the same generated voltage in each series group of armatures and assures equal distribution of the load among the motors. Stabilizing resistors are



THE 22.5-KW. MOTOR-GENERATOR SET WHICH FURNISHES LOW-VOLTAGE POWER SUPPLY ON THE SWITCHING LOCOMOTIVES

used to equalize the resistances of the parallel field circuits. Both the exciting current and the generated current flow through these resistors. Any tendency of one group of armatures to generate more than its proportion of the current decreases the field current of that group and correct division of load is automatically restored. The range of speed in regenerative braking will be from 8 to 30 m.p.h.

Adequate provision for effective opening of the high-voltage circuits is secured by inserting the main resistance in the circuit prior to the final break at the line switches. This is done whenever the main motor circuit is opened, whether through manipulation of the master controller or under action of the overload relay.

SWITCHING LOCOMOTIVES ARE LARGELY STANDARD

The switching locomotive is similar in general design to Baldwin-Westinghouse standard Class D locomotives. The cab is of the steeple type and is carried on two swivel trucks. On each two-axle truck are mounted two motors driving direct through standard helical gears. The estimated weight is 136,000 lb. The control is arranged for double-end operation.

The nominal rating of the locomotive is 560 hp. With

TABLE II—DIMENSIONS AND WEIGHTS OF SWITCHING LOCOMOTIVES

Track gage.....	5 ft. 6 in.
Length over buffers.....	40 ft. 0 in.
Length over central cab.....	17 ft. 0 in.
Length over hoods.....	27 ft. 0 in.
Total wheelbase.....	27 ft. 4 in.
Rigid wheelbase.....	8 ft. 6 in.
Height, top of rail to cab roof.....	12 ft. 3 in.
Width over cab sheets.....	10 ft. 0 in.
Height of couplers.....	38 1/2 in.
Wheel diameter.....	42 in.
Weight of complete locomotive.....	136,000 lb.
Weight of mechanical parts.....	86,000 lb.
Weight of electrical equipment.....	50,000 lb.
Weight per driving axle.....	34,000 lb.

3,000 volts at the locomotive and natural ventilation of the motors the tractive effort for one hour is 19,600 lb. at 10.6 m.p.h., and the continuous capacity is 11,400 lb. at 12.7 m.p.h. With 25 per cent nominal adhesion the starting tractive effort is 34,000 lb. The maximum speed is 35 m.p.h. For short periods the equipment is capable of developing 1,000 hp. At loads corresponding to the continuous current rating of the motors, the speed will be 5.9 m.p.h. in series and 12.7 m.p.h. in series-

parallel. With one pair of motors cut out, 50 per cent of the locomotive capacity will be available for starting and for running.

Table II gives the general dimensions and estimated weights of the locomotive.

This locomotive will be capable of handling, in yards with level tracks, trains of 1,200 short tons. This capacity, though in excess of that required for serving the initial trains of 770 short tons, is desirable to provide for the expected increase in traffic.

The trucks are of the rigid-bolster equalized type with rolled steel frames located outside of the wheels. A center pin is located at approximately mid-length of each rigid wheelbase. The central cab has an engineman's stand in each end and control apparatus centrally located and suitably protected. Buffers, couplers and air-brake equipment are duplicates of those on the road locomotive.

The control equipment comprises apparatus similar to that already described for the road locomotives.

The four Westinghouse No. 350-D-2 motors are of the series type, wound for 1,500 volts. This motor has an hour rating of 140 hp., at 79 amp. and 1,500 volts. The pinions have sixteen teeth, 2 D.P., and the solid helical gears have sixty-three teeth.

The motor-generator set has a two-part frame, each part containing two bearings in which runs a common shaft carrying two armatures, one a 1,500-volt motor (insulated for operation two in series at 3,000 volts) and the other a low-voltage generator.

The motors are connected in series for 3,000-volt operation and the generators are in parallel. With 3,000 volts applied to the motors, the generators will deliver 22.5 kw. at 92 volts. The set supplies power for the compressor motor, lights and control circuits.

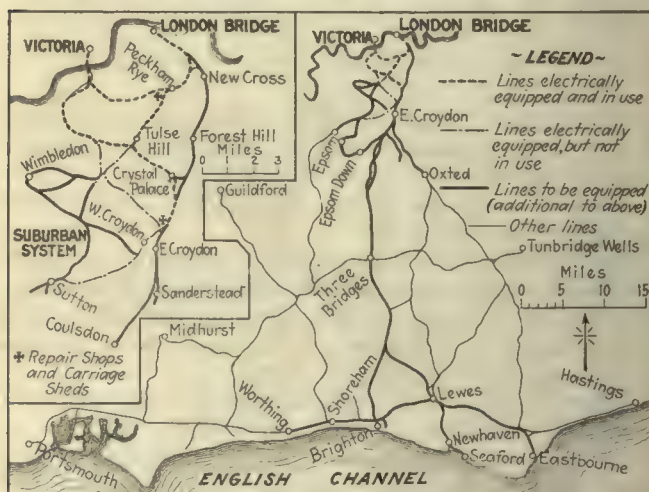
A master controller is mounted in each end of the central cab, each with a reverse lever with forward and reverse positions, and a speed lever for accelerating. A total of nineteen notches are available in operation. Shunting transition is used.

Further Electrification Promises Congestion Relief

SIR PHILIP DAWSON and the officials of the London, Brighton & South Coast Railway, England, have recently made an investigation as to the possibilities of extending electrical operation on its lines. This study,

Location	Service		Percentage Increase in London Trains	Percentage Increase in All Trains, Loaded and Empty
Victoria.....	Main Line.	Electric over steam	220	152
London Bridge..	Main Line.	Electric over mixed steam and electric	143	58
Victoria.....	Suburban..	Mixed steam and electric over pre-electric all steam	94	100
Victoria.....	Suburban..	Electric over pre-electric all steam	225	206
Victoria.....	Suburban..	Electric over mixed steam and electric	68	53
London Bridge..	Suburban..	Mixed steam and electric over pre-electric all steam	38	21
London Bridge..	Suburban..	Electric over pre-electric all steam	206	86
London Bridge..	Suburban..	Electric over mixed steam and electric	121	53

as reported in the *Electrician*, London, showed the desirability of such extension to include not only the outer London suburban area but would reach as far



PRESENT AND PROSPECTIVE ELECTRIFICATION ON LONDON, BRIGHTON & SOUTH COAST RAILWAY

as Brighton, Eastbourne and Worthing. The plan involves the equivalent of 141 single-track miles on the single-phase system in addition to the 70 miles now in successful operation.

The accompanying table shows the estimated benefit from the electrification with respect to train-handling capacity on the congested terminal sections.

Gasoline Rail Car Operated at 40 Cents a Mile

Another Example of the Increasing Popularity of the Single Self-Propelled Unit on Steam Railroad Sections Where Traffic Is Light and Frequent Service Is Appreciated

ON JAN. 1 of this year the Lewisburg, Milton & Watsonstown Passenger Railway put into operation a gasoline rail car, which is used in regular service over the tracks of the Pennsylvania Railroad between Montandon and Mifflinburg, Pa. The distance between



THIS CAR OPERATES OVER THE P. R.R. LINE BETWEEN MONTANDON AND MIFFLINBURG, PA.

these two points is 10.9 miles. The car was delivered on its own wheels over the Pennsylvania Railroad lines from Philadelphia to Milton, Pa., a distance of 167 miles.

For February and March the car-mile cost averaged 40.23 cents, but it is expected this figure will be lowered as the operating personnel becomes more familiar with maintenance of the gasoline car. The railway company gives the following cost figures, in cents per car-mile:

	Cents per Mile Feb.	Cents per Mile March		Cents per Mile Feb.	Cents per Mile March
Wages.....	17.79	17.43	Maintenance (labor).....	0.59	0.58
Gasoline.....	5.93	5.38	Interest.....	4.39	3.88
Lubricants.....	0.64	0.72	Depreciation.....	9.14	8.08
Miscellaneous.....	3.19	2.30	Insurance.....	0.11	0.10
Maintenance (material).....	0.14	0.07	Total.....	41.92	38.54

The depreciation is figured on an eight-year basis, a first cost of \$16,564.03 and an approximate life of 200,000 miles. The company operates storage-battery cars over the Montandon-Mifflinburg route, and the same force has been used to operate the rail car. Two men form the rail-car crew. The motorman runs the car and assists the conductor in handling mail, baggage and express. Overhauling and repairs are handled in the shops of the company, which employs one barn man for both gasoline and storage-battery cars.

The present schedule allows thirty-eight minutes for the run of 10.9 miles, the stops averaging about 1½ to the mile. The run is divided up into four fare zones, the fare in each being 7 cents. Railroad tickets are honored when presented, and the Pennsylvania Railroad reimburses the company for them at regular zone rates.

The car seats forty passengers, thirty-five in the passenger compartment and five in the baggage compartment. The body was built by the J. G. Brill Company, Philadelphia, and is mounted on a Mack A.C. chassis with a 22-ft. wheelbase. The car is 9 ft. 8½ in. wide and 27 ft. 11½ in. long, both over-all dimensions.

Zone Passes for Beaver Valley

The Fare per Zone on a Cash Basis Is 5 Cents, but Unlimited-Ride Service on Transferable Passes Has Been Made Available for Rides Covering One, Two or More Zones

THE Beaver Valley Traction Company, as described in the *ELECTRIC RAILWAY JOURNAL* for April 9, 1921, is a cross-country electric railway with a main line 9.5 miles long between College Hill and Leetsdale and several other routes. With the Pittsburgh & Beaver Railway, there are 26 miles of route. The population of the entire district is about 64,000 and of the largest community, Beaver Falls, 13,000.

In pre-war days this railway was on a 5-cent zone basis with zones up to 6 miles. The first fare changes were to 6 and 7 cents respectively with no change in the lengths of zones. As these higher fares did not produce the necessary increases in revenue and also cut down the number of customers, the company returned to a basic fare of 5 cents per zone, but the length of zone was cut to an average of 2 miles. This kept the fare within the limits of the towns served to 5 cents.

The 5-cent, short-zone plan proved the best plan tried up to that time, but unluckily soon thereafter came the depression, which hit the Beaver Valley so hard that traffic for eleven months ended Nov. 30 compared with eleven months of 1920 showed a loss of 18 per cent despite 10 per cent more service and no increase in fare. In these circumstances, W. H. Boyce, general manager of the railway companies, decided to sound the public before making any further changes in fares or service.

To this end, he sent out copies of the accompanying questionnaire to the larger employers of labor in the district for distribution among their people. The answers to these questionnaires showed where a large proportion of the employees lived, where they were employed, where they boarded the car, whether they owned or made use of fellow workers' automobiles, what they thought of the trolley service and whether they would be likely to buy a transferable, unlimited-ride weekly pass.

Disregarding, for the present article, the questions and answers relating to cars and service, the poll on the fare queries brought out the fact that (a) some people rode to work but not from work; (b) few rode home to lunch but would do so if the fares were lower; (c) some had stopped using the cars although comparatively few had automobiles or used the machines of their friends; (d) people who happened to live rather close to a zone boundary protested against the 10 or 15-cent fares which they had to pay for comparatively short rides each day.

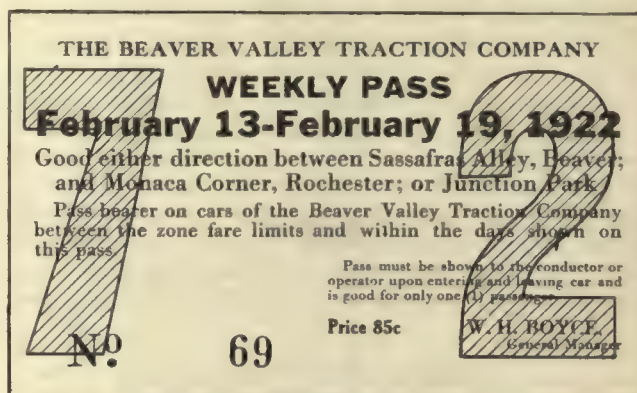
Of course, the fact that the answers showed the writer's place of employment and of residence made it possible to judge whether he really was a good prospect for unlimited rides a day at more advantageous rates of fare.

After the information from this questionnaire had been compiled, the company printed a little folder of acknowledgment and explanation which it distributed to passengers through boxes in the cars. It took up the principal points of which complaint had been made and offered a few words of explanation about them. Thus, to the criticism that fares were high, the circular pointed out that it is impossible at this time to reduce

the charge per ride except when rides are purchased by the wholesale, as by a weekly pass. Complaints that the safety car was not desirable were answered by the statement that it was a modern car, more than 5,000 of them being in operation in the United States and that it was a means of keeping the railway service going in a great many communities or of giving a more frequent service. Reasons beyond the control of the company for car delays were given, and passengers were urged to investigate the advantages of the pass.

ZONE-FARE TICKET MACHINE HELPS GREATLY IN TRAFFIC ANALYSIS

As explained, when the zone system of fare collection was begun the plan followed was to collect a new fare at each zone boundary. Upon the introduction of one-man safety cars on the Beaver Valley main line—which has seven active zones throughout the year and eight in summer—the company installed the Shanklin machine



A TWO-ZONE WEEKLY PASS

for issuing zone-fare receipts, as described in the *ELECTRIC RAILWAY JOURNAL* for Nov. 26, 1921. The records from this machine were of the greatest value in working out fare alterations because they show for any desired run, day or week, the origin and destination of every passenger.

For example, the analysis of Route 2001, the main line, for Friday, Dec. 16, 1921, showed:

3,933 passengers rode within one zone
1,348 passengers rode within two zones
217 passengers rode within three zones
78 passengers rode within four zones
96 passengers rode within five zones
102 passengers rode within six zones
4 passengers rode within seven zones

These figures alone indicated that it was hardly worth while to get out a special form of transportation ticket for any ride exceeding three zones, even if that class of traffic would be doubled thereby. In addition, the Shanklin records also permitted the separate classification of each set of zone passengers, the one-zone riders on Route 2001 varying from 1,519 to 86 in number, according to the location of the zone. This gave a clue to the further elimination of special transportation.

An analysis was also made of the steam railroad

PLEASE FILL THIS OUT

If you want a lower street car fare please fill out this blank, answering each question, as it is material to us in making a survey of the conditions. Your filling out this blank may result in our adopting a ticket method by which you will feel justified in using the street cars more frequently

By what plant/are you employed? _____
(Give name and location by street and No.)

What is your name? _____

What is your house number? _____ On what street do you live? _____

_____ In what town? _____

Do you ride the cars to your work? _____

Where do you board the car going to work? _____

At what time of day? _____

Do you ride home from work? _____

Where do you board the car? _____

At what time of day? _____

Do you now ride home to lunch? _____

Would you ride home to lunch if the fare is reduced? _____

About how much do you spend for all of your street car fares, per week? _____

Do you own an automobile? _____

Do you use it to go to and from your work? _____

Do you carry other workmen with you? _____

What is there about our service that is not satisfactory to you? _____

If we sold a pass for a certain amount that would permit you or any member of your family to ride as frequently as you might wish, would you be likely to buy such a pass each week? _____

With the question of a reduced fare for the worker to be considered, won't you help us reach a decision by filling out this card?

We thank you.

THE BEAVER VALLEY TRACTION COMPANY
and
THE MANAGEMENT OF THIS PLANT

SETS OF THIS QUESTIONNAIRE WERE SENT OUT TO EMPLOYERS FOR DISTRIBUTION AMONG THEIR EMPLOYEES

commutation service and rates in this territory with a view to seeing if any of it could be transferred to the electric railway. It was found, however, that the bulk of this business is done during the rush hours and is handled at such low rates that they could not be met by the electric railway. For the runs exceeding three electric railway zones, also, the steam railroads offer a big advantage in speed to all who live reasonably near the stations.

A VARIETY OF ZONE PASSES ADOPTED

As the result of these several studies, the company decided to install an adaptation by Walter Jackson of the unlimited ride pass first suggested by him for Racine, Wis., and since installed at Kenosha, Youngstown and Fort Wayne (Feb. 28, 1922). Actually, the Beaver Valley passes as inaugurated on Feb. 13, 1922, strongly resembled the station-to-station season ticket of the London Underground Railways, since instead of being universally valid over all parts of the railway they could be used only between the points shown on the pass. This naturally made the pass less attractive because it may not meet the social or amusement direction of travel desired by the same person who finds it handy for his home-job riding. To meet this condition, the \$2 three-zone pass is now good for unlimited riding in either direction.

The number of passes originally installed was twenty, made up of:

1 school pass	\$0.75 per week
11 one-zone passes	\$0.85 per week
6 two-zone passes	\$1.60 per week
2 three-zone passes	\$2.00 per week

The experience of the first four weeks showed that in some cases the number of passes sold of a given kind did not make it worth while to print so many varieties. The company is prepared, however, to sell

from its office any combination on demand. For these rarer styles, a rubber stamp for zone identifications will answer. The revenue from the sale of passes has increased from week to week. The whole plan is simply an effort to promote good will, and give the public every possible opportunity to make more use of the company's facilities.

The pass procedure is very simple. On boarding or leaving either a one-man or two-man car, the passholder shows his pass, which bears the zone designations in either numerical or letter form, according to the route. On leaving, he shows it again. The figure "7," in the cut on page 673, is simply for the seventh week of the year. In addition to the zone designations (single or combination), the card carries the names of the boundaries. It will be understood that a passholder can ride beyond the boundaries shown on his pass merely by paying for the excess zones in cash via the locked farebox.

Of course, the ideal scheme would be to sell passes good for one, two or more zones on any part of the line, but this would involve so much checking that it would be impracticable on a one-man car. With the present plan, there is absolutely no addition to the work of the operator. In fact, his work is reduced because every pass ride means one fare transaction and receipt issuance less.

Because of the double visé of the pass, it is not necessary to change the colors frequently or to use different colors for different zones. The small number of each kind required also demands simplicity from the standpoint of the printer's bill. Mr. Boyce has solved the problem of pass cost neatly enough by selling the space on the back to the local lighting company at a figure that eliminates this factor. A word or two is in order on the principle used in fixing the prices of the passes. That of the one-zone pass is 85 cents, which is equivalent to seventeen rides a week or practically three rides a day. In such small communities as are served by this company, a pass-holder can readily average four rides a day by making it his business to go home to lunch or ride instead of walk in the evening or on holidays. Thus, he gets his two off-peak rides at half price.

The price of the two-zone pass was set at \$1.60, which is equal to sixteen 10-cent rides a week. The concession is slightly greater because of the greater revenue paid per trip and because a two-zone rider will be likely to average fewer extra rides outside of the "home-job" trips. The cost of the universal pass is \$2 or the cost of thirteen and one-third rides, since this class is likely

RUN
HOME
AND SPRUCE
UP
GOT A DATE
Use That Weekly Pass
BEAVER VALLEY TRACTION COMPANY W. H. BOYCE, General Manager

GOING
To the Basket Ball Game?
USE THAT WEEKLY PASS.
Beaver Valley Traction Company
W. H. BOYCE, General Manager

RUN
DOWN
TOWN
GET
ICE CREAM
FOR
SUNDAY
DINNER
USE THAT WEEKLY PASS
Beaver Valley Traction Company
W. H. BOYCE, General Manager

THE PASS WAS WELL ADVERTISED BY THESE AND OTHER NOTICES IN THE DAILY PAPERS

Street Car Fares Way Down Now

Ride on a Weekly Pass

All the Riding You Want for a Solid Week at
About What You Spend Now

- | | | |
|---------|--------|------------------------|
| 1 Zone | \$0.85 |for a Weekly Pass |
| 2 Zones | \$1.60 |for a Weekly Pass |
| 3 Zones | \$2.00 |for a Weekly Pass |

A Hundred Rides for Two Dollars

They Now Cost You Fifteen Dollars

We can make this enormous reduction when we are assured of so many rides each week. A certain volume of Pass sales will remove the uncertainty from our business. You are to profit by this.

If You Want This Reduced Fare Buy Your Weekly Pass Now and Buy One Each Week

The pass is probably the only way by which we will be able to reduce the present fare within a period of several years.

We Believe You Should Have Some Reduction in Fare

We want to bring down the cost of living. We believe the wholesale purchaser of rides should have some reduction in fare. After months of study, in which we were assisted by many local manufacturers and their employees, and the most prominent fare expert in this country, Mr. Walter Jackson, of New York, we have decided on the adoption of the Weekly Pass. Our receipts are running 22% behind last year's, but still we can't close down and wait for business to pick up. We are going out after business even with this enormous reduction in rate.

We Want You to Know that We Want Your Business

It is essential to your own prosperity that the transportation lines of your community prosper. Suppose we shut down two weeks or three to six months every year? What kind of a community would this be?

Do You Appreciate that We Never Shut Down?

That always, day and night, the loyal street cars are at your service? Good times and slack times, rain, snow, fog, in cold or hot weather, always ready to take you anywhere on our lines. If you appreciate it

Buy Your Pass On Sale Now by all Conductors

Buy a Weekly Pass

Ride as Often as You Can

BEAVER VALLEY TRACTION COMPANY

W. H. BOYCE, GENERAL MANAGER.

Buy Your Pass
On Sale Now by
all Conductors.

WHY REGULAR RIDERS SHOULD BUY THE PASS

to take still fewer excess rides; nor will many steam railroad commuters be likely to change over.

Although the number of passes in use was twenty, the number of applications was greater, inasmuch as some of the passes are good between specified points on either the main line or the Riverview line (Route 2005). This arrangement also gives the passholder a more liberal use of his transportation than otherwise. No attempt has been made to record the number of rides taken on each kind of pass, but each kind could be recorded in turn purely as a matter of curiosity, if desired.

NO MEANS OF PUBLICITY LEFT UNTRIED

Mr. Boyce is known as one of the country's strongest believers in, and practitioners of, publicity. An inspection of the window cards, dasher placards and newspaper advertising would reveal that he reveled in the opportunity for good will offered by the unlimited-ride pass. The newspaper advertisements, in particular, display his direct, candid way with present and prospective customers. Among the varieties of copy used was the curiosity type, as in the one headed "ComingWE---- PA-----What Is It?"; the personal

style, as in the one reading "Got a Date? Run Home and Spruce Up. Use that Weekly Pass"; the timely variety, as "Going to the Basket Ball Game?" and a "Go" advertisement urging some of the many uses as: To work, to bowl, to see "honey-bunch," to church, to school, to visit the well, to visit the sick, to the lodge, to the club, etc.

Both the problem of selling the pass and of advertising its uses are complicated by the fact that the shoestring layout of the Beaver Valley system demands a variety of passes. For this reason, one cannot expect at any time the same high range of percentages of sales and use possible with a universal city pass. The fact that the base fare is the convenient nickel also tends to restrict pass sales in comparison with systems with higher and more cumbersome rates of fare.

Wages Lag in Living Cost and Price Declines

ANALYSIS of changes in wages and commodity prices and in living costs throughout the United States from 1914 to 1921, made by the J. L. Jacobs Company, engineers, Chicago, shows that wage increases ran ahead of living costs in 1918, and that at the peak early in 1920 average wages had increased approximately 134 per cent over 1913, while the cost of living increase for the same period was about 116 per cent. Since then both living costs and commodity prices have declined much more rapidly than the wages of employed industrial workers. Digests of wage changes during 1921, made by this organization, cover reports from 1,026 establishments and industrial groups in practically every key industry in the country and show average wage reductions during the year 1921 of 16.1 per cent for over 5,000,000 workers.

Data from the 1026 establishments and industries show that approximately 4.7 per cent report reduced wages 30 per cent or over, 8.6 per cent reduced wages between 25 per cent and 30 per cent, 24.2 per cent reduced wages between 20 per cent and 24 per cent, 18.2 per cent reduced wages between 15 per cent and 19 per cent, 34.1 per cent reduced wages between 10 per cent and 14 per cent, and the balance of 10.2 per cent made wage reductions of less than 10 per cent.

Classified according to industries, the data show the largest reduction in the meat packing industry. There the average reduction has been 25.5 per cent for the 200,000 workers in that industry. The reductions then taper off to 14.8 per cent for approximately 140,000 street railway and other utility employees in 161 cities, approximately 12½ per cent reductions for railroad and express employees and an average 16.4 per cent reduction for over 866,000 employees in miscellaneous establishments and industries.

Among the public utilities, wage reductions reported show that of the 161 organizations thirty-five reduced wages 5 per cent to 9 per cent, fifty-seven reported reductions of from 10 per cent to 14 per cent, thirty-one from 15 per cent to 19 per cent, twenty-six from 20 per cent to 24 per cent and twelve reduced wages over 25 per cent. Some of the larger street railways reporting reductions were in the cities of New York, Philadelphia, Brooklyn, Boston, San Francisco, Detroit, Cleveland, Pittsburgh, Denver, Los Angeles, Seattle, Albany, Indianapolis, Buffalo, Milwaukee, Omaha, Topeka, Council Bluffs, Salt Lake City, Mobile, Ala.; Fort Wayne, Syracuse, N. Y., and Newark, N. J.

Control Equipments for the Frankford Elevated

Electro-pneumatic, Battery Operated Unit Switch Control with Many Special Features Was Chosen
—Interchangeability with Existing Equipments of Market Street Lines Can Be Had with Few Changes

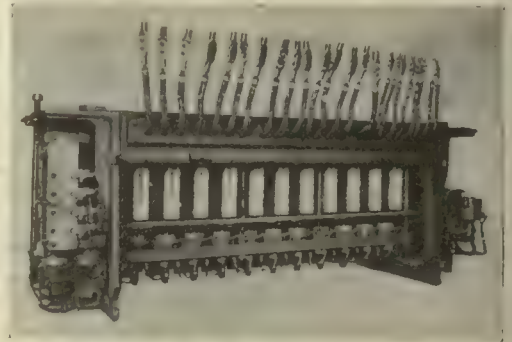
THE control equipments for the cars for the Frankford Elevated line in Philadelphia will include all features necessary for extending subway as well as elevated service. The use of storage batteries insures an uninterrupted supply of energy for the motor control, the emergency lights, door engines, signals and other devices necessary for efficient and safe operation in underground service. With the motor control fed by a storage battery, the train may be stopped in an emergency by reversing the motors regardless of the availability of line voltage. Also the source of control energy not being dependent on the power available on the head car of a train makes it unnecessary for the motorman to operate the train from the second or third car when the main power fuses are blown on the head car, thus eliminating one source of delay encountered in elevated service where battery control is not used.

Another consideration in which battery control has apparent advantages is in regard to reliability of regular operation. This is insured, since the comparative low voltage of the storage battery practically eliminates control failures due to insulation breakdowns, and the low voltage is not dangerous to life.

The unit-switch control equipment includes twelve Westinghouse electro-pneumatic unit switches of the HL type for effecting the principal changes in the main motor circuits, and also for overload protection. Eleven of the switches are grouped together into a main switch group, on the ends of which are mounted the drum-type motor reverser and the control sequence drum. In addition to the main switch group, another similar unit switch is mounted in a separate frame, with the arc chute venting to atmosphere. This unit serves as a line switch, opening on overload as well as interrupting the circuit under normal conditions. On

the ends of the line switch are mounted the overload trip relay, line switch operating relay and the notching relay.

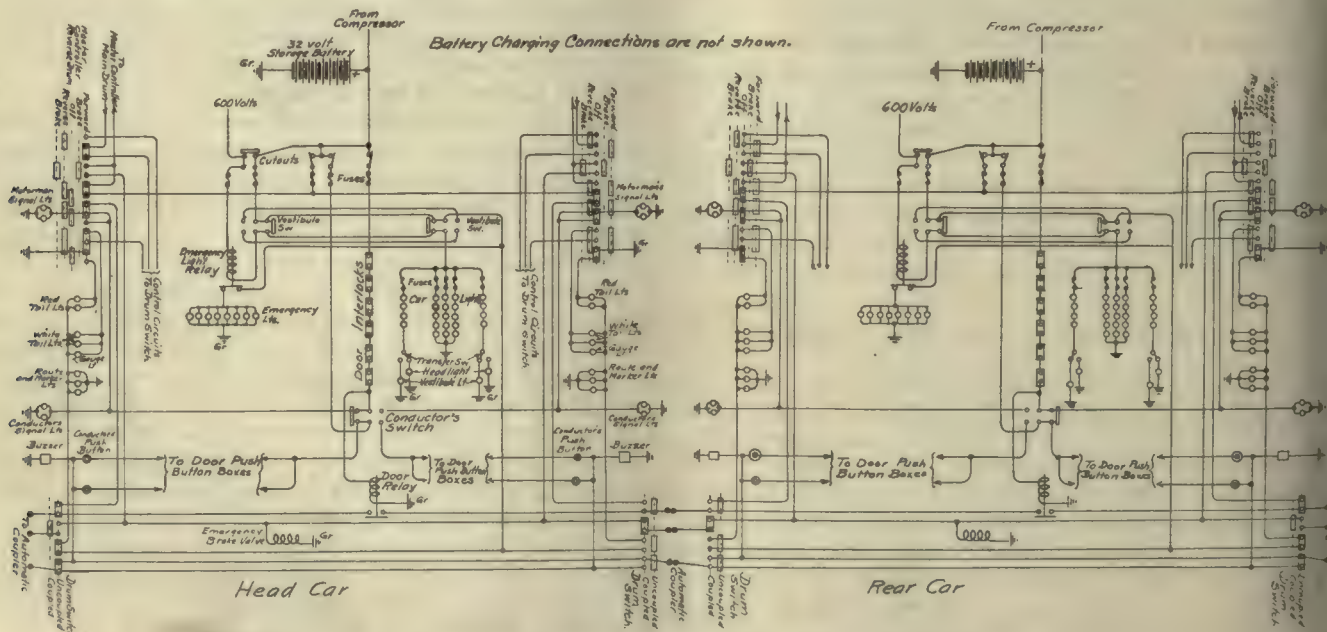
Automatic acceleration is accomplished by a current limit relay governing the movement of the sequence drum and thus energizing the unit switch magnet valve coils in a certain definite sequence. For the specific manipulation of the main circuits during acceleration, six steps are provided with the motors connected in



SWITCH GROUP—REVERSER AT END

series, four steps with the motors connected in parallel, and the closed circuit or bridging transition between the series and parallel connections. The normal or tapped field connection of the motors is effective on the last full parallel running step.

The grouping of the unit switches, with their supplementary control apparatus, into two boxes gives an assembly which is compact, yet fully accessible for maintenance or inspection purposes. The use of separate electro-pneumatic unit switches for all main circuit switching provides accurate means for control of the acceleration in trains. The compressed air required



SCHEMATIC DIAGRAM OF LIGHT AND SIGNAL CIRCUITS FOR A TWO-CAR TRAIN

for operating the switches is taken from the common air brake supply through a reducing valve to give a normal pressure of 70 lb. per square inch.

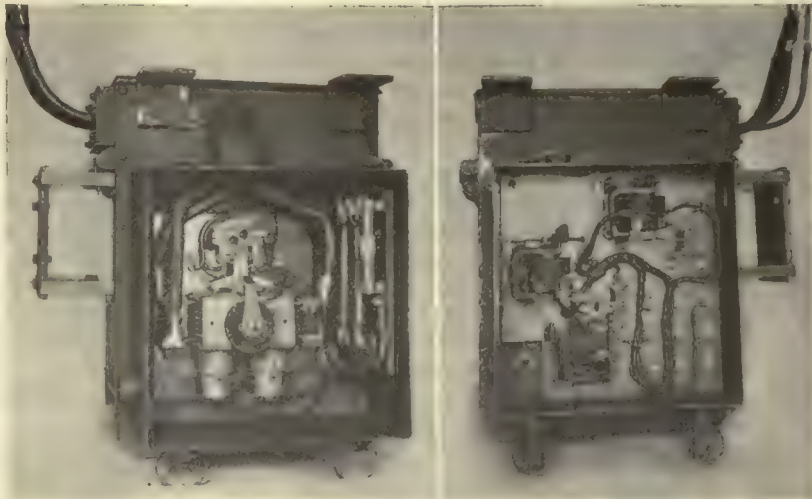
Control power for operating the electro-pneumatic apparatus is taken from the 32-volt storage battery that is charged in series with the compressor motor. A train line circuit connects in parallel the positive poles of all batteries of a train and the control power is led from this common train line connection to a master controller at each end of the car. The master controller is provided with two handles, a main accelerating handle permanently attached to the controller and a removable reverse handle for controlling the direction of car movement. The two handles are mutually interlocked so that the main handle cannot be moved unless the reverse handle is in one or the other operating position. The movement of the reverse handle energizes the master controller drum from the control circuit supply and establishes circuits for the "Dead-man's" operation of the brakes and for the signal and marker light circuits. The emergency or "dead man's" application of the brakes from the master controller is secured both electrically and pneumatically. The main handle of the master controller has an upward movement whenever the motorman's hand is removed. This releases the fingers on the upper positions of the reverse drum and closes the circuit to the emergency wire of the air brake system. The same upward movement of the handle releases a small air valve in the top of the controller which operates a secondary relay valve that exhausts air from the brake pipe of the train.

From the master controller, the control power is led to a train line from which the circuits are taken to the various unit switches and allied operating devices. Provision is made for cutting out of service any defective car in a train by means of a small drum type control cutout switch mounted on the panel board at one end of the car and connected in the circuits to the control apparatus. The train line runs to automatic electric couplers attached to the drawbars of the car. The train line contacts on the face of the coupler are energized through a separate drum switch which is operated when the cars are coupled in train to connect both air and electric train lines. Ten of the eighteen train line circuits in the coupler are utilized for motor control purposes, five for the electro-pneumatic air brake circuits, two for signals and one as an extra for any future extensions to the auxiliary circuits.

Protection for the control equipment is provided by the main and third rail fuses in conjunction with the overload trip relay and the high speed-line switch. The line switch opens at an extremely high speed in response to the overload relay, or due to a sudden drop in line voltage, which usually accom-

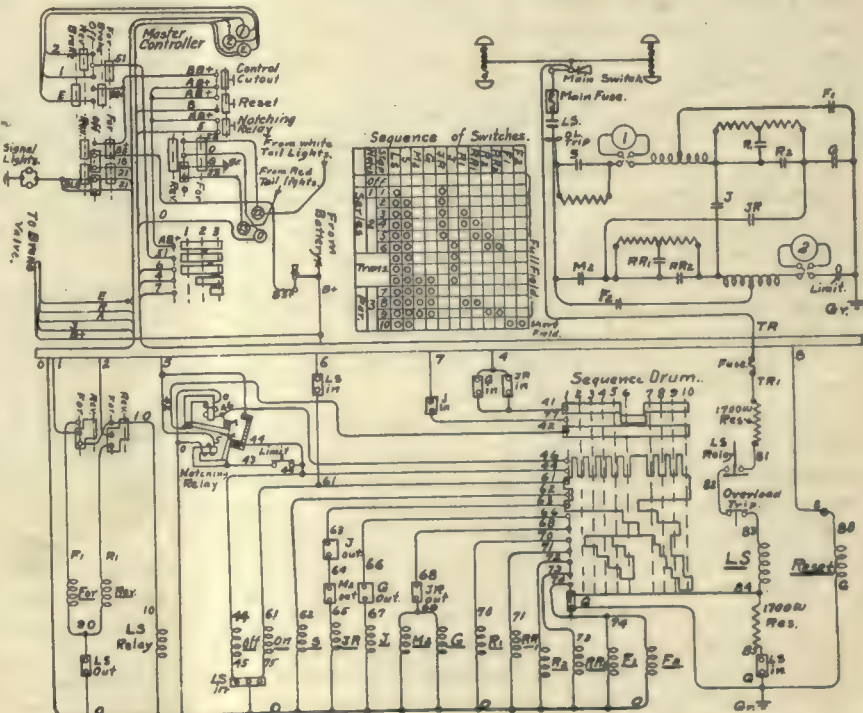
panies the sudden and very severe momentary loads that occur on third rail systems. A high-voltage surge usually follows immediately after the sudden voltage drop and the high speed of the line switch enables it to open quickly so as to protect the motors against the voltage peak. Operating the high-speed line switch by trolley voltage insures positive opening on the momentary interruptions of power when the train is passing at high speed over gaps in the third rail. In this way, the power circuits are opened locally on each car after passing each gap and the control operates automatically just as when starting the car, thus preventing flashing of the motors and surging of the cars in the train.

The overload trip relay has two operating coils, each connected in the circuit to one of the motors. The relay operates at the same overhead current value per motor with the motors in either the series or the parallel combination, thus allowing closer adjustment and better overload protection than would be obtained if a relay



OVERLOAD TRIP RELAY OF LINE SWITCH

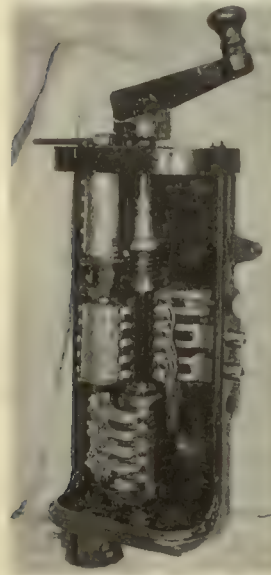
NOTCHING AND OPERATING RELAYS OF LINE SWITCH



SCHEMATIC CONTROL DIAGRAM OF FRANKFORD ELEVATED CARS

with a single operating coil were used and connected in the main power circuit to the third-rail shoes.

The sequence drum is essentially a secondary master controller that operates on the balanced-air principle, having the usual on and off magnets for regulating the admission and release of compressed air to the double-end piston which is geared to the contact drum. The drum is advanced automatically, notch by notch, by the "off" cylinder, being intermittently charged and discharged by the limit relay energizing or de-energizing the "off" magnet circuit. In addition, the sequence



MASTER CONTROLLER

drum, in combination with the notching relay, provides means for securing non-automatic notching of the control independent of the limit relay. This operation becomes necessary only under exceptional circumstances, such as accelerating a train after it has stopped on the grade when coming from the subway to the elevated structure, or in a two-car train when one car has been cut out of service.

The notching relay is mounted on the line switch. It comprises essentially two relays mounted at right angles with the contacts interconnected so that notch-by-notch operation can be obtained when desired by intermittently energizing one of the relay coils from a push button located at the side of the master controller. The other relay coil is connected to the limit and sequence drum circuits so as to be energized each time the sequence drum advances a notch, which insures that the drum will pause momentarily on each notch during automatic acceleration.

There are eight tail lights per car, located in groups of two beneath the window rails at each end of the car. One of the 20-watt lamps of each pair is provided with a white lens, the other with a red lens. The interlocking in the master controller and drum switches is such that when the cars are coupled, the lights are automatically disconnected at the coupled ends, but the white lights show at the head end of the train where the master controller reverse drum has been operated, and the red lights show at the rear end of the train. The marker and route indicator lights on the ends of the car are also arranged to be lighted only at the head and rear of the train. This arrangement reduces the drain on the battery to a minimum, and also insures that the proper lamps are always lighted without special attention on the part of the train crew.

The motorman's and conductor's signal lamps are located at each end of the car in plain view of the motorman inside the car and the conductor outside between the cars. The lamps at the conductors' station between cars burn when the doors of the adjacent cars are closed, and at the motorman's station when all the doors are closed throughout the train. This selection of circuits is made by means of a conductor's switch and a relay on each car connected in series with the door interlocks on the car. The relay contacts throughout the train are connected in series by a train line circuit, which receives its energy through the

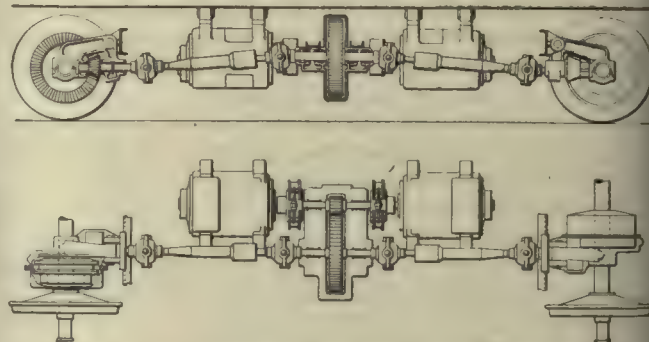
master controller reverse drum and coupler drum switch at the rear of the train. This scheme places comparatively few interlock contacts in series throughout a long train, thus reducing to a minimum the chances of signal failure from open circuit or excessive voltage drop. In case a door cannot be closed completely, thus preventing light signal indications, the buzzer system insures that the motorman receives the starting signal. The buzzers are used at all times, being relayed from conductor to conductor, beginning at the rear of the train. The motorman starts the train upon receiving either the light signal or the buzzer signal.

Differential Drive Radial Truck in Germany

THE Dortmund Street Railway Company has recently put in operation an experimental single-truck car with differential drive. The truck is of the radial type, and the drive somewhat similar to that on an automobile except that both axles are driven through separate differential shafts from twin motors in the center of the truck. The mechanical portions of the truck and driving mechanism were supplied by F. Krupp & Company of Essen, and the rest of the equipment by Brown, Boveri & Company. The car was put in operation in June, 1921, and according to *Verkehrstechnik* has run nearly 4,000 miles without failure.

The accompanying drawing shows plan and elevation of the system of motor suspension and motor drive. The truck has a wheelbase slightly over 13 ft. Owing to the nature of the drive, the axles can take a radial position when the car is passing around a curve, and no difficulty has been experienced in driving this car at a speed of 22 m.p.h. around a curve of 70-ft. radius.

The motors are attached to the car underframe, the



PLAN AND ELEVATION OF NOVEL MOTOR DRIVE FOR SINGLE-TRUCK CAR

flexibility between the motors and the axles being secured by two universal joints in the driving shaft. The gage is only 1 m. (3.2808 ft.). The radial arrangement would permit the car to pass easily around a curve with a radius of 50 ft. and still keep the wheelbase at 13 ft. Usually with a single-truck car and a gage of 1 m. it is not practicable to have the wheelbase more than 10 ft., and even this is productive of much grinding at the curves.

United States Commerce Reports have been rearranged and are now classified by commodities and geographically with special sections devoted to transportation, tariff, commercial law and similar subjects. The information is received direct from over 600 representatives of the United States Government in the world's industrial and commercial centers.

Letters to the Editors

An Appeal for a Square Deal for Electric Railways in New York

NEW YORK, N. Y., April 10, 1922

To the Editors:

Civilization is something the world has fought countless centuries to achieve. Men relish it today and struggle for its maintenance because they have come to realize that it not only is the cheapest but also the easiest way to live. Next to peace of mind what they most long for is physical comfort.

To obtain physical comfort a man pays three times the rent that he needs to pay in order to domicile himself in an apartment with elevator service. For the same reason he hires a taxicab to take him a distance that he could easily walk or, if he is a man of means, he rides to his office mornings in his limousine when the subway, the elevated lines or a bus would take him there more expeditiously.

It is because of the physical comfort that it gives, with its rule that every passenger shall have a seat and there shall be no crowding, that the service of the Fifth Avenue Coach Company has become so popular. It is, in fact, the Pullman service of city transportation, and the waiting crowds along its various routes demonstrate the willingness of the people of New York to pay a reasonable price for a service which is distinctive and which assures physical convenience and comfort.

Americans are the hardest workers in the world. That is why America leads all countries in the conveniences, comforts and luxuries that it offers its people. It is bred in the bone of Americans to pay unhesitatingly for service well rendered. Briefly, such service means the efficient, proficient supplying of the conveniences of life at a cost economically sound and just.

Among all modern conveniences what is more essential today than transportation? America was the first great nation of the world firmly to weld itself together by land transportation. And for the comforts and conveniences that its great transportation systems offer its people have always been willing to pay a fair price. No American seeks something for nothing. Few Americans are blind to the fact that great aggregations of capital which have been made to render public service are entitled to a fair earning power.

We have heard much, through the press and otherwise, of what has been termed the "disgraceful overcrowding and congestion of present transit facilities." Yet here in New York, a city which enjoys the most wonderful and safest transportation system the world has ever known, there is continued insistence that a service shall be rendered at a price which represents an actual loss to those furnishing it. No other service, public or private, is demanded on such terms by our people. Fair and square in everything else, they obstinately insist on what has come to be known as "the 5-cent fare." Their attitude is so untrue to the real American spirit of square dealing that it is difficult to understand.

For the first time in our history we find our people demanding something for which they are unwilling to pay a fair price. Not only are they forcing the trans-

portation companies to economies which necessarily reflect themselves in the service given, but they are choking off the development of our subway systems, and frightening capital away from traction investments which must be made by private citizens if our rapidly growing transportation needs are to be met.

It is time for New Yorkers to think these things over, to close their ears to the wailings of the agitators and demagogues who have made our transportation system a football for their private political ambitions, and to approach the matter in the true American spirit, as other cities have done.

This, in a word, calls for the square deal; a fair price for an honest service rendered, no more, no less.

What has become of the hard common sense, as well as the sense of fair play, of the New Yorker of bygone days?

M. A. SCREEBER.

*Standardized Methods of Employment**

BUREAU OF PERSONNEL RESEARCH
CARNEGIE INSTITUTE OF TECHNOLOGY

PITTSBURGH, PA., April 3, 1922.

To the Editors:

I have been interested to note that electric railway men are showing increasing interest in the scientific selection of men for their services. The interest in vocational selection methods generally is rapidly increasing. Evidence of careful study of means of improving the quality of employees comes from every direction. The question of getting the best men and women available is not limited to employees, as that term is usually understood, but extends to the need for better minor and major executives. All of us have realized the importance of the problems connected with obtaining satisfactory employees, but until the last few years we have been helpless in the face of the complexities involved. That electric railways are also interested in better selection is only evidence that they too wish to be in the forefront of this new movement.

My own belief is that the increasing importance attached to selection is being brought about by the rapidly developing appreciation of the business value of good will and satisfaction. "The public be damned" policy, or caustic criticism of the individual employee or of the transportation system in general, is giving way before constructive suggestions from public-spirited men, before the selection of "boosters" as employees and before carefully planned instructions on how the public can make the transportation system more efficient. One passenger crosswise in a car either in temper or actual position; one tired, cross platform man, can do more to destroy efficient service and satisfied patrons than a whole fleet of trucks stalled on the tracks. The adjustment of the human element is of utmost importance.

For these reasons I wish to commend the ELECTRIC RAILWAY JOURNAL for opening its pages to a discussion of the problems of selection as applied to platform men. I have read with interest the discussion of the report of a committee of the American Electric Railway Transportation & Traffic Association on this subject, and I have also enjoyed reading Dr. Gradenwitz's interesting

*The author of this letter was one of the compilers of the "Army Mental Tests" referred to in the discussion on personnel and training of transportation department employees at the 1921 Atlantic City convention of the T. & T. Association. As major in the army, he had much to do with personnel work during the war.—EDITORS.

article in the Jan. 28 issue and Dr. John Leeming's article in the March 11 issue of the JOURNAL. Both writers have done an important and suggestive service; one in calling attention to the great need for carefully planned testing procedures, the other in emphasizing the inadequacy of the usual medical, neurological and physical examinations.

WHAT RECORDS SHOULD BE KEPT

There are certain points that, to my mind, should be more fully emphasized in the discussion of a selection program. An extremely important consideration is the matter of records. It should be impressed upon every official of every company that no question and no test applied to a prospective applicant is so unimportant that it can go unrecorded. In the first place the application of such a principle will eliminate much that is useless or disregarded in the interview and in the routine of the employment office. The only exception to the principle that occurs to me now is the introductory conversation that aims to set the applicant at ease before the beginning of the formal interview or test series. Even this should be carefully standardized. But a more important reason for careful observance of this point lies in the need for detailed records of the medical, physical, mental, emotional and social characteristics of the applicant. Unless the routine of record keeping is regularly maintained we shall never satisfactorily establish the value of any preliminary examination. Dr. Leeming has successfully shown the importance of the medical records in several specific instances. A like importance will finally attach to the other records if properly kept.

All of us have seen personnel men, employment managers, welfare workers and even plant physicians dismissed in the last few years. One reason, among others, has been the failure of these employees to demonstrate the importance of their work. They have relied too much on the performance of routine duties and too little on the accumulation of facts. If the facts demonstrate the value of tests and of routine examinations, no official is going to risk the loss of that information. Much of this work is new and therefore experimental. Certain psychological tests and records will doubtless prove to be of no value to a particular concern. It is therefore important that careful records be available so that a distinction can quickly be made between those that are proving of distinct importance and those that are not.

MENTAL ALERTNESS AND EFFICIENT EMPLOYEES

One of the striking discoveries dependent on the development of mental alertness tests is that men become dissatisfied and do not perform their work efficiently if their mental capacity is either above or below that required by the nature of their tasks. All sorts of reasons may be found to explain why the employee is inefficient or resigns or must be discharged. But the evidence now available shows that the majority of these are false, and that dissatisfaction and inefficiency can more often be traced to a lack of adjustment between the capacities of the employee and the requirements of the task given him. To determine the requirements of the task is the function of the job analysis. To determine the capacities of the applicants is the function of the physical and mental measurements.

The special ability tests as described in the Jan. 28

article illustrate one important series of measurements needed. They do not, except indirectly, indicate the mental level of the applicants. An applicant could conceivably perform these acts successfully and fail to pass the course of instruction that follows; or, passing both, become an employee and there quickly find the routine of his job unbearable. Space will not permit specific illustration of just such actual results. The Bureau of Personnel Research has determined the mental level of several thousand employees of different types in the last five or six years. It has been found very difficult to estimate mental alertness without tests so that employees can be properly placed. Groups that are commonly described as of average intelligence have been shown to be, in some occupations, above, and in others below, the estimated intelligence. Physical and emotional stability factors as determined by the physician, being equal, careful determination of the mental alertness differences in groups enable us to predict progress, efficiency and satisfaction more readily and accurately.

RECORDING THE INTERESTS OF EMPLOYEES

Other questionnaire forms of yet more recent development enable the employment manager to determine the major lines of interest and likes of the applicant. Where there are no distinguishable physical emotional or intellectual differences between two groups, it has been shown by appropriate questions that there is a wide difference in the things in which these two groups are interested; in the things they enjoy doing over and over, and in their ways of working with others. Of course, we all recognize that platform men should not be selected merely because they are needed nor because men want jobs. But in these days of many applicants, and good ones by every measure we have so far been able to apply, it is important to forecast as far as possible the probable length of service of the men selected. Employment managers tell me that this is one of their most pressing problems now. It is therefore important now, as it always will be, to select those men who by nature and training are willing to enter the particular occupation as a life work.

PERFORMANCE RECORDS

It is perhaps unnecessary to point out the need for performance records and for tests in the improvement of performance with practice. So many public service corporations and private corporations as well find these necessary for promotional, disciplinary and legal purposes. Two points may be emphasized. The difficulty of getting satisfactory records of efficiency, and the need for such standards in evaluating the various records of personal history, medical examinations, psychological tests, training courses and later tests for promotion. Many tests have been discarded both by the physician and the psychologist, or by the impatient executive when no one had sufficient data to evaluate the tests. Promotions have been based on factors that bore no relation to continuous efficiency of performance on the part of the individual.

In my very brief comments, I have endeavored to emphasize certain points that, I believe, will keep these new and important aids to proper selection and placement from suffering serious setbacks at the hands of their many friends. I have mentioned two or three forms of examinations that in my opinion should be included in any comprehensive employment procedure.

they would require at most thirty minutes additional time of the applicant. But most important of all, the nature of psychological examinations ought to be determined on the basis of adequate records and sound statistical procedure.

C. S. YOAKUM,
Director.

The Trolley Shoe or "Slide" at Low Speed

NEW YORK CITY, April 17, 1922.

To the Editors:

I happened to notice C. L. Greer's letter on the above subject, in your issue of April 15, page 641.

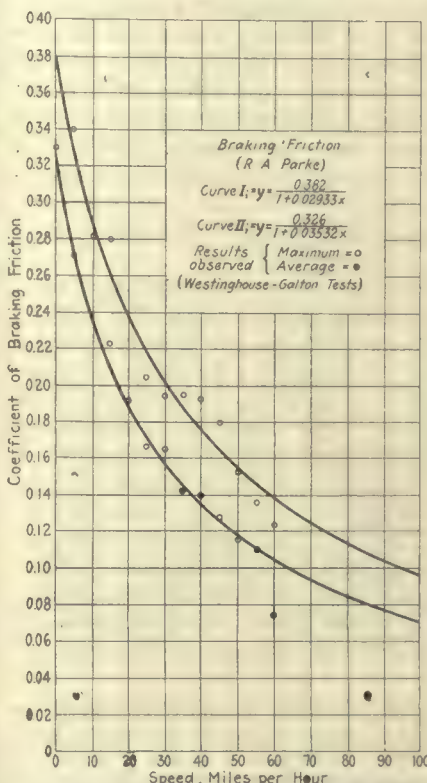
Mr. Greer appears to have proved by tests that the wear on the trolley wire is very much greater at low speed with the slide than with the trolley wheel, and that the extra wear is due almost entirely to increased friction at low speed.

He is entirely right on both points. It may have seemed strange to him, as it usually does to most people, that the friction and wear should be greater at low speed than at high speed; but it is all right, because it is all in perfect accordance with the physics of friction between unlubricated surfaces. As a matter of fact, everybody connected with the operation of a railroad already knows something, in a practical way, about unlubricated friction, because concrete examples of it are brought to his notice repeatedly by the wear of brake-shoes and of carwheels. It is well known that the grip of a brakeshoe on the tread of a carwheel, and the wear which is caused in both the shoe and the wheel, are much greater at low speed than at high speed, with the same contact pressure. Indeed, it is precisely this fact that complicates the action of a brake involving a variation of the brakeshoe pressure as a function of the speed of the train, because a constant shoe pressure means the danger of slipping, above a certain speed, and of skidding, below a certain other speed. Now the friction between a trolley wire and a non-lubricated trolley shoe or slide is exactly of the same physical character as the friction between a brakeshoe and a wheel tread. The explanation is the same and is very simple in both cases, being the physical fact that the coefficient of friction is very high at low speeds and falls off rapidly as the speed increases.

The relation between the coefficient of friction and the "velocity of rubbing," in the case of brakeshoes, was studied exhaustively by Galton and Westinghouse more than forty years ago. The accompanying diagram, taken from the printed notes given to the students attending my lectures on electric railways, about twenty years ago, gives the principal results of the tests made by Galton and Westinghouse, as reported and collated by the late R. A. Parke, a world authority on this subject. In this diagram the abscissas represent the speed of the train or car, in miles per hour, this speed being the same as the "velocity of rubbing" between the brakeshoe and the tread of the car wheel; and the ordinates represent the coefficient of friction corresponding to different rubbing velocities. Now the sliding speed of the trolley shoe or slide is the same as the train speed and the same as the velocity of rubbing of the brakeshoe. Hence, this diagram would also represent correctly the conditions in the case of the friction between the sliding shoe and the trolley wire, if the metals which are in frictional contact in this case were the same. As a matter of fact, however, the difference in dry sliding friction obtained with different metals is not very great,

so that these curves approximate closely to the results that would be obtained from actual tests of the friction between metal surfaces of the same kind as the trolley wire and the trolley shoe. The curves will, in any case, be accurate enough to give an idea of the rapid increase in the coefficient of friction as the speed decreases.

By reference to the lower curve it is seen that the coefficient of friction is about 0.12 at 50 m.p.h. and double that value at 10 m.p.h. As the speed is further reduced the coefficient increases rapidly, being 0.28 at 5 m.p.h. and 0.32 at 0.5 m.p.h. The wear should, therefore, be the greatest at the points where the cars run most slowly, or where the greatest number of stops is made.



FRICITION BETWEEN UNLUBRICATED METAL SURFACES AT DIFFERENT SPEEDS

have shown in my lectures, to the algebraical sum of two values, one of which is on a descending curve similar to the curves shown in the diagram, while the other is on an ascending curve starting from 0 at zero speed. This means that the friction, when a lubricant is used, is made up of two kinds of friction, namely, solid or unlubricated friction, as before, but to a much lower degree, and liquid or viscous friction. The former decreases, and the latter increases, with the velocity of rubbing. The graph representing the solid friction component is of hyperbolic character, same as in the diagram, but with scales of ordinates which depend upon the condition of the rubbing surfaces, in respect to smoothness and finish, or polish, etc. The graph representing the liquid friction component is of parabolic character, the scale of ordinates depending upon the quality and condition of the lubricant. The resultant curve, representing the composite result, is a two-branch curve, having its highest point at or near "zero" speed, and which falls down to its lowest value at a very low speed and then rises as the speed increases. The scale of ordinates, in this case, depends upon both the condition of the rubbing surfaces and upon the quality and condition of the lubricant, as might be expected.

C. O. MAILLOUX.

made. Comparing the points of highest speed and fewest stops on an interurban line with the points of lowest speed and of most frequent stops in cities and towns, we would be warranted, from the curves shown in the diagram, in expecting the wear of the trolley wire to be two and one-half times greater at the stopping points. It would be interesting to know whether Mr. Greer has found as great differences as this. With a lubricated trolley shoe the case is quite different, because the coefficient is then equal, as I

Electric Railway Publicity

Devoted to How to Tell the Story

Illinois Travels De Luxe

THE Illinois Traction System, Peoria, Ill., is now advertising its four-car electric train which operates nightly between Peoria, Springfield and St. Louis. So inviting is the service offered, in addition to the smokeless and cinderless feature of the trip by trolley, that no doubt the ticket agent will soon acquire the haughty air heretofore known only to the box office manager of a New York theatrical success. The folder, well illustrated, talks variously of the observation compartment of this marvelous train, the club compartment, with tables for writing of cards, and the smoking compartment.

The Pullman accommodations on the train beget wonder, and in themselves could win all traffic, for each of the twenty berths is nearly 6 in. longer than in Pullman cars on steam trains. Windows are provided in upper berths, and both upper and lower berths have safety deposit vaults for valuables. The train, which was on exhibition at the midwinter meeting of the American Electric Railway Association, is 216 ft. in length, weighs 360,000 lb., and cost \$107,000. While the train was on exhibition near the Claypool Hotel where the Indianapolis meeting was held more than 10,000 persons inspected it. It received much publicity both at Indianapolis and in towns en route, where large crowds, informed in advance of the arrival of the special, collected to inspect it.

A heavy-duty sixty-ton electric locomotive is used to transport the passenger coach, sleeping car and parlor



GROUP OF DELEGATES INSPECTING TRAIN

car. Engineers of the Illinois Traction System designed the equipment and part of it was built in the company shops. Officials of the company feel that the train demonstrates the comfort and safety of electric railway transportation and the possibilities which lie in the interchange of equipment between electric and steam lines.

Officials of electric railways in Illinois were carried to the Indianapolis meeting in the car. Throughout Illinois the train was operated over lines of the Illinois



VIEW OF THREE-CAR TRAIN AND LOCOMOTIVE EN ROUTE TO INDIANAPOLIS CONVENTION

traction System. From Danville, Ill., to Crawfordsville, Ind., the tracks of the Big Four Railway were used. At Crawfordsville the train switched to the tracks of the Terre Haute, Indianapolis & Eastern Railway.

Sousa Concert Widely Advertised

THE Shreveport Railways utilized the local concert engagement of John Philip Sousa to advertise the convenience of the railway service. Practically the entire quarter-page advertisement was devoted to the announcement that Sousa and his famous band would play at the Fair Grounds. His program was announced in full, and a short biographical note of the conductor was contained in the advertisement.

The concert and the railway were coupled finally with the following:

The weather being inclement, you will be glad if you leave your automobile at home while attending the concerts and use the street cars. No Skid—No Danger—and much cheaper. The street cars take you to the Fair Grounds gate. You have a smooth concrete walk up to the Coliseum. Cars go to the Coliseum every seven and one-half minutes. There will be plenty of extra cars for the rush after concerts are over. Ride the street cars.

Utility Problems Discussed Direct with Public

A SERIES of fifteen meetings with stockholders of the Public Service Corporation of New Jersey was started on April 3 when Thomas N. McCarter, president, discussed the problems of public service enterprises on the Proctor Theater roof, Newark. With Mr. McCarter were Percy S. Young, vice-president in charge of finance; Edmund W. Wakelee, vice-president and general solicitor, and Harlow C. Clark of the publicity department, who also spoke. Mr. McCarter described the meeting as the first of a series of "one night stands" throughout the State.

In the audience were 1,500 men and women. It was estimated by company officials that a quarter of these were employees and the others stockholders. Mr. McCarter made an appeal for co-operation of stockholders, and asked that the company's past mistakes be forgotten. On his part he promised to forget the sharp criticisms directed at himself, and expressed hope that eventually every customer of Public Service would be a stockholder in the concern, paying monthly bills with dividends received.

Mr. McCarter said the idea of meeting the stockholders was advanced first by the head of the Pacific Gas & Electric Company in California and that he intended to "go about the State presenting the gospel of public service in one night stands" with his associates, making friends as best they could. Telling of 58,000 holders of company securities, he spoke of their remarkable power to create public sentiment that "would stand by us if we are right and see that we get a fair deal."

"The man at the head of a public utility company who does not crave the help and co-operation of the stockholders does not deserve the authority to run a corporation," Mr. McCarter said. He declared the two campaigns his company had made to have the general public become stockholders in the company had "just touched the fringe" and he hoped to see the company's 300,000 gas and electric patrons, as well as others, take stock in the concern eventually.

He announced himself as an optimist and said now that the war's problems are practically over the corporation is emerging from its handicaps better than ever. He referred to newspaper reports to show the stock is appreciating in value, and said the great activity of Public Service securities on the New York Stock Exchange augured well for the future of the company.

The problem ahead of Public Service is to get \$5,000,000 or \$6,000,000 of new capital each year, to keep pace with the growth of business and the public demand for improved service, he said. The bond market was exhausted for company securities and investments in common and preferred stock must provide this additional capital, Mr. McCarter added.

He said handicap results when the demagogue, the politician or any one else steps in to put a stop to this flow of financial support from the public. "He only cuts off his own nose as, deprived of this aid, the company is unable to supply the needs of the public," said Mr. McCarter.

Railway Wants to Know Sentiment of Patrons

A CAMPAIGN to determine the sentiment of residents of northern Kentucky regarding Green Line service is under way by the South Covington & Cincinnati Street Railway, Covington, Ky. Questionnaires are being placed in every home in northern Kentucky, ostensibly for the purpose of aiding the traction company with suggestions as to how to improve its service for the benefit of the public. The questionnaires also are distributed in the Dixie Terminal and boxes have been provided in the cars for the receipt of the questionnaires when filled out.

The Federated Improvement Association of Covington has issued a statement warning the citizens not to sign any papers asking for an increase in fares until they heard the people's side of the question.

The South Covington & Cincinnati Street Railway is operating under a perpetual franchise in northern Kentucky cities which fixes the fare at 5 cents. Several years ago the traction company offered to surrender its perpetual franchise and accept in lieu a twenty-year franchise with the right to increase fares. The offer was rejected by the City Commissioners of Covington and Newport.

Polk Laffoon, president of the traction company, said that the company is merely trying to ascertain the sentiment of its patrons relative to its service by the distribution of the questionnaires and is not endeavoring to get as many signatures as possible and then present a petition to the city commissions of northern Kentucky municipalities with the request that the company be given the right to increase its rates of fare.

A copy of the questionnaire is as follows:

To Green Line Patrons:

The development and progress of northern Kentucky depends on adequate transportation. We are trying to do our part to provide as much service and as well distributed accommodations as have been possible considering the revenue we have been receiving.

Our public relations department was organized to acquaint you with the operation of the Green Line and its relations to the development of Campbell and Kenton Counties. Through the "Topics" our problems have been explained; the difficulties which have beset us in trying to make our income meet the demands made upon it, and the uncertainties regarding future developments, have been brought out.

Requests have been made for changes, bettered and additional service, and service impossible under our present

franchises. In keeping with our endeavors to give Green Line patrons what they want and need, we desire to obtain expressions from the car riding public showing what service is wanted in each locality.

Your reply is earnestly solicited in order that we may best serve your requirements. Kindly fill in this sheet carefully, and then hand it to the conductor on your next trip or drop it in the "question boxes" provided at the Dixie Terminal and waiting stations.

1. What car lines do you ride?.....
2. How many members of your family use the cars?....
3. Is time between cars satisfactory?..... (Yes or No). If not, what would you suggest?.....
4. Are more cars needed on the lines you use?..... (Yes or No). If so, should additions be to the regular or "rush" service?.....
5. What betterments or additions would you suggest?
6. How far will you go to aid us in bettering service, considering facts we have shown regarding the Green Line Nickel?

If It's Good for a National Advertiser It's Good for You

FOR years the Tri-City Railway, Davenport, Iowa, sold the advertising rights in its cars, but used none of this space itself. The space was always at a premium and the best known nationally advertised brands of foodstuffs and other goods were displayed there. The company also sold the right to place banners on its cars, but never used this space itself.

The year 1922 has marked a decided change. The company, in addition to selling space, has reserved some itself and every car now operating carries either an advertisement urging the public to buy United Light & Railway's prior preferred stock or educational copy.

For instance, a signboard swung in the top of the car carries these statements:

"This company has been required to invest over two-thirds of a million dollars in paving."

"In 1921 the fare of every twelfth passenger went to pay interest and depreciation on this investment and did nothing to improve the cars or rails on which you ride."

"Passengers on street cars don't ride on pavement. Seems as if the paving should be paid for by those who use it."

"Gentlemen: Fairness and consideration for the women and children require that there be NO SMOKING on this car."

"On the reverse of the card is a placard like this:

"YOU WILL BE INTERESTED TO KNOW

"That last year, a year of hard times—the Tri-City Railway Company alone paid out to your community—\$461,260 in wages, or \$1,260 each day; \$134,670 in supplies, or \$370 each day; \$66,400 in direct taxes, or \$182 each day.

"That's trading in your home town, isn't it? Two-thirds of a million dollars in the year, \$75 worth every hour."

President B. J. Denman is planning to continue the advertising campaign and a series of strong arguments has been prepared which are designed to win more consideration for the utilities by the public. Thus there is presented for study the strange case of a utility company finally realizing that right at hand on its own property there is presented, perhaps, the very best medium of communication with the public. In other words, Tri-City Railway has been "sold" on its own advertising space, space which the biggest national advertisers in the country were "sold" on long ago.

Comfort Plus!

BY PROVIDING luxury, plus service, the Kansas City, Clay County & St. Joseph Railway is keeping itself favorably before the public. Its latest appeal to the luxury complex, as Freud would term it, takes the form of a parlor and observation compartment made part of a regular car. Parties attending meetings take to this club car as through the ages the proverbial duck has



LUXURIOUS OBSERVATION END OF CONVERTED CAR

taken to the omnipresent water. The special compartment, with its soft carpet, upholstered chairs and soft draperies, provides a convenient and secluded place where conferences can be held en route from or to Kansas City, St. Joseph, Excelsior Springs, Liberty and other way points.

To charter the car a minimum of fifty round-trip tickets must be purchased at regular fare.

It takes less than an hour to convert one of the regular standard steel cars, 60 ft. in length, into the special. The six regular car seats of the rear twelve-foot compartment are unscrewed and five mahogany office chairs and three leathered folding chairs substituted. A heavy wilton carpet is used to cover the floor and is fastened with grommets and knobs. The entire equipment cost \$284.

It is a wonderful territory through which the Kansas



EXTERIOR OF TYPICAL CLAY COUNTY CAR

City, Clay County & St. Joseph road operates, a country in which there is something new to be seen on every trip. The way to see it best, of course, is from the luxurious observation end of one of the Clay County cars.

Rail Cars Must Combine Automotive and Railroad Practice*

BY CHARLES GUERNSEY

General Manager Railroad Division, Service Motor Truck Company

PREVIOUS to 1905, efforts had been made to build a single-unit car, steam-propelled, for use on railroads. These cars were unsuccessful, owing primarily to boiler limitations. The light-fire engine type of boiler was too expensive to maintain and the locomotive type was too heavy. They had no particular advantage over the ordinary type of steam locomotives. They did not eliminate roundhouse supervision, etc. About 1910 the General Electric Company developed a car propelled by electric motors, current for which was supplied by a 200-hp. gasoline engine connected to an electric generator. A number of these cars were built, and some of them are still in service. They were not successful, however, because of the great weight, complication and maintenance expense made their operating cost almost as high as that of a steam train.

Mr. McKeen of the Union Pacific developed the McKeen car, of which probably more have gone in service than any car yet developed. Here again, however, the great weight necessitated an engine considerably larger than was commercially accepted, so that the total operating cost of the car was only slightly less than the operating cost of the steam train. Cars of the McKeen type were not popular, because the builders attempted to provide in a gasoline car the same capacity and speed supplied by the ordinary steam train, consisting of a locomotive and two cars. Wherever such capacity is required, the steam train can ordinarily be operated at a profit. The real field for the gasoline car is in service where the steam train has more capacity than is required.

About ten years ago a car was built by the J. G. Brill Company, Philadelphia, on contract for the inventor. The engine was mounted amidships, driving by silent chain to a countershaft from which the drive was by propeller shaft to two bevel gear axles, one on either truck. Cars have been built by Hall-Scott, Sargent and others.

It is generally conceded that for continuous heavy duty work engines having cylinders larger than a 5-in. bore are not commercially successful. Warp-age, lubrication difficulties and heating of valves, piston heads, etc., become too difficult to handle. If this is correct, then the failure of the heavy cars can be traced directly to a failure to appreciate the limitations of the gasoline engine.

So much for the development by the railroads and railroad men. On the other hand, manufacturers of motor trucks have for several years equipped chassis ranging from $\frac{1}{2}$ -ton to 5-ton

capacity with flanged driving wheels, to adapt them for operations on rails. These cars have in general been successful. Owing to the light weight, low rolling resistance and the small engines required and in some installations to the fact that they can be handled by one man, the operating cost has been low. These converted motor trucks, however, were unduly limited in capacity and speed. There still remains a decided middle ground between the rail bus or rail car, as we have known it in the past, and the field of the steam train. It is in this middle ground that the gasoline rail car can make a place for itself, provided it is designed specifically for operating on rails. It is in no sense a converted motor truck. It represents a combination of automotive and railroad practice.

In the past the designs have been

safety, steadiness, comfort and convenience of the steam coach. This means that it should include such features of design as four-wheel pivoted trucks front and rear, full speed either direction, air brakes and safety appliances. The rail car shown here has an over-all length of about 44 ft., a seating capacity of thirty-eight, drop seats for eight in the baggage room, making a total capacity of forty-six passengers. The baggage space is 70 sq.ft. The car is provided with standard vestibule doors, saloon, comfortable seats and electric lights. Yet the total weight of this car is only 13 tons. This is less than one-third of the weight of the old-time motor cars of the same capacity, and a 60-hp. engine can be used, as against the 200-hp. engine required by the other types. At the same time a speed of 48 m.p.h. has been obtained, and a speed of 35 m.p.h. can be maintained indefinitely without damage to the mechanism. The fuel consumption is small, the car running between 5 and 7 miles to a gallon of gasoline. Because of the light weight, the car has a good acceleration, a speed of 25



GASOLINE CAR FOR RAIL SERVICE. IT WEIGHS 13 TONS AND CARRIES THIRTY-EIGHT PASSENGERS, WITH DROP SEATS FOR EIGHT IN BAGGAGE COMPARTMENT

based almost entirely on one practice, to the exclusion of the other. To illustrate the point, some of the earlier cars developed by the railroad men weighed more than 50 tons and required a 300-hp. engine, although they had seats for only from fifty to sixty passengers. They did not give due consideration to the automotive side of the design. They attempted to use a gasoline engine in a car of steam railroad design.

By careful design and the use of alloy steels, anti-friction bearings and other features proved in automotive use the weight can be materially reduced. Weight must be a minimum in order to keep the rail car requirements within the capacity of proved gasoline engines.

It is just as undesirable to forget the railroad point of view entirely. Many of the features of railroad designs are the result of almost a century of development. The designer must weigh his problem carefully, choosing from railroad practice those features which fit in with this new type of equipment.

The rail car should combine the light weight of the motor truck with the

m.p.h. being reached from a standstill in thirty seconds.

This car is arranged with two four-wheel pivotal trucks. The drive is from the power plant located forward, through an auxiliary transmission contained in the bolster of the front truck, to the two axles of the front truck. The auxiliary transmission is so arranged that either one of two pairs of gears can be used to transmit the drive, thus giving in effect two high gears. One of these gears is proportioned for the ruling grade on the particular railroad where it is to be used, while the other gear is proportioned to give a maximum speed in straight-away operation.

The success of the rail car, after all, hinges primarily on the engine. The car must be designed with this thought always uppermost. The engine must stand up under the severest service. It must be capable of operating continuously at high speed and under wide-open throttle. It must operate with the minimum of vibration. Everything must be accessible and so arranged that repairs can be made quickly.

The gasoline rail car will enable many branch lines and short lines, which are

*Abstract of paper given March 29 at Indianapolis before Indiana Section, Society of Automotive Engineers.

now operated at an enormous loss, to be converted to a money-making basis. A 13-ton car has low first cost and can be operated for 20 to 30 cents per car-mile, as against a cost of \$1 to \$2 per mile for steam operation.

The gasoline rail car as a unit possesses many advantages over steam and electrified service—speed, frequent service, low cost of operation, crew of one or two men, elimination of the usual terminal facilities and great reduction in initial cost and fixed investment. Frequent service can be given, which may not be justified by a steam train. A freight-carrying unit can be installed in conjunction with a passenger unit, at an initial cost much below that of a passenger unit.

Utilities Division Purchasing Agents' Association Proposed

A MOVEMENT is under way in the National Association of Purchasing Agents, which has a membership of approximately 4,500, to form a division for public utility purchasing agents including the electric railways, light and power, telephone, water and gas companies, many of whom are already members of the various state purchasing agents' associations. Harry H. Lloyd, purchasing agent, Indianapolis Street Railway and the Terre Haute, Indianapolis & Eastern Traction Company, is chairman of the public utilities committee and public relations committee of the Indiana Association, and was appointed chairman of the tentative national committee at the Indianapolis convention of the National Association of Purchasing Agents.

Mr. Lloyd reports that a great many public utility buyers throughout the country are interested in a division of the national association which will be devoted to the common interests of the utilities and still maintain the advantage of affiliation with the purchasing agents of the big manufacturing industries of the country. Mr. Lloyd had suggested the formation of utility committees in various states which will be co-ordinated in a non-geographical national committee and will also develop an interest of the railway membership in the purchase and stores committee of the A.E.R.A.

It has been suggested that as the National Association of Purchasing Agents holds its convention at Rochester, N. Y., May 15 to 20, 1922, as many utility purchasing agents as possible attend this convention whether already members of the various state purchasing associations or not. If sufficient interest is manifested in the movement by the public utility buyers, it will be possible to have a national committee definitely organized at that time. Mr. Lloyd says this should be of great advantage to the various utilities throughout the country.

A dinner for utility purchasing agents will be held on Tuesday, May 16, at the Rochester convention, and also a joint conference with the national fuel committee.

Improvement in Unemployment Situation Among Engineers

ACCORDING to reports from the Employment Service Bureau of the Federated American Engineering Societies the records of the first quarter of 1922 indicate a distinct improvement in the unemployment situation in the engineering profession. There was a 41 per cent increase in the number of men placed by the bureau and more than 100 per cent increase in the number of available positions listed with the bureau in this quarter compared with the same quarter.

The bureau reports that there is a noted increase in the higher grade openings which are sent in, indicating that many companies are actively preparing for a return to more normal business conditions, in the mind of the bureau.

Public Conference on Business Training of Engineers Called

THE United States Commissioner of Education is calling a second public conference on commercial engineering to investigate business training of engineers and engineering training for students of business.

The conference will be held May 1 and 2 at the Carnegie Institute of Technology in Pittsburgh. Outstanding topics at the conference will deal with the new problems that have recently arisen in modern industries, the solution of which demands a more scientific approach to include job analyses and personnel specifications and a translation of these into a new and teachable content for use in our engineering and commerce schools, with the training of the engineer for a better understanding of problems relating to community development and with the training of the engineer for management of overseas engineering projects.

Southwestern Electrical & Gas Association

A JOINT meeting of the Southwestern Geographic Division, N. E. L. A., and the Southwestern Electrical & Gas Association will be held in San Antonio May 3 to 6. A summary of the program follows:

Wednesday, May 3. Morning, opening joint session. Afternoon, separate meetings of the following sections or committees: accounting, commercial, public relations, technical, railway.

Thursday, May 4. Morning, joint session. Afternoon, separate meetings of the same sections mentioned above. Evening, banquet.

Friday, May 5. Morning, joint session. Afternoon, joint session followed by executive session, N. E. L. A. division; separate meetings of power and railway sections.

Saturday, May 6. Morning, executive session of S. E. & G. A.; separate meetings of accounting technical and public relations sections, southwestern division, N. E. L. A.

A list of the papers scheduled for

presentation at the railway sessions follows:

"Merchandising Transportation," by G. I. Plummer, superintendent of traffic, Dallas Railway.

"Economics of Car Maintenance Through Modern Shop Practice," by Walter Silvus, master mechanic, Texas Electric Railway.

"Methods for Relief from Traffic Congestion," by W. H. Holden, superintendent of transportation, San Antonio Public Service Company.

"Standard Transfer for Different Companies." Round-table discussion lead by A. B. Paterson, acting general superintendent of railways, New Orleans Railway & Light Company.

"Accident Prevention Methods," by Alves Dixon, superintendent of railways, El Paso Electric Railway.

"Vocational Training," by C. J. Crampton, superintendent of safety and efficiency, Dallas Railway.

"Adjustment of Track Construction and Maintenance to Modern Light Weight Cars," by R. G. Taber, engineer, Stone & Webster, Fort Worth.

"Operation of Double Truck Cars with One Man," by G. S. Brush, superintendent of transportation, Houston Electric Company.

"Possibilities of Motor Bus or Trolley Bus for Suburban and Feeder Service." Round-table discussion led by J. P. Griffin, general passenger agent, Texas Electric Railway.

"Overhead and Car Current Collecting Devices," by L. E. Delf, electrical engineer, Northern Texas Traction Company.

"Training Platform Men," by W. E. Robertson, superintendent of transportation, Eastern Texas Electric Railway.

"Accounting for Passenger Receipts," by W. R. Burns, assistant treasurer, Dallas Railway.

American Association News

Heavy Electric Traction

THE committee on heavy electric traction of the Engineering Association held its organization meeting in New York City on April 20. The result of the conference was a plan for compiling data and for digesting the discussion on this subject at the Rome International Railway Congress, which, by a coincidence, was in session at the same time. The New York meeting was attended by these members: Sidney Withington, New Haven Railroad, chairman; A. H. Armstrong, General Electric Company; H. W. Cope, Westinghouse Electric & Manufacturing Company; J. C. Davidson, Norfolk & Western Railway; J. H. Davis, Baltimore & Ohio Railroad, and L. S. Wells, Long Island Railroad. J. V. B. Duer (who was attending the Rome congress) was represented by Mr. Viele.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Favors Purchase Plan

55,669 Votes in Favor of Municipal Ownership—Mayor Hopeful for Future Operation

Detroit electors voted with a majority of nearly 82 per cent indorsing the Detroit United Railway purchase plan, thus ending the thirty-year traction war and again approving municipal ownership. The Detroit United Railway's city system will be taken over on May 15 as provided in Mayor Couzens' proposal and replaced by a municipally-owned system, which according to the plans of the municipal street railway officials is to be made the largest municipal ownership system in the world as well as one of the best in the world. Because of bad weather conditions and the lack of interest on the part of some of the qualified voters, only a small vote was cast. Of the 67,912 votes polled, 55,669 were in favor of the purchase plan, giving a considerable larger percentage than the 60 per cent favorable vote required.

\$2,770,000 DOWN PAYMENT

In connection with the purchase plan approved, a bond issue of \$4,000,000 was voted, of which \$2,770,000 will be paid as a down payment on the D. U. R. When the system is turned over to the city. The remainder of the bond money will be used to purchase material and supplies which the company has on hand and which the city has agreed to purchase, and to provide working capital. Semi-annual payments of \$100,000 will be made by the city until 1933 at which date the balance of the \$2,850,000 will come due. Interest at the rate of 6 per cent will be paid on all of the unpaid balance. The money will go to a trust company to the credit of mortgage and bondholders of the company.

Mayor James Couzens, who has consistently maintained that the lines can be made to pay under city ownership, believes the city will be able to make its payments out of the earnings from the system and that in addition enough will be earned to rehabilitate the property. The city will not be liable if even the system fails to make enough money to meet the payments. To company interests could collect money by going into the courts and attaching the street car property. The property could be taken back in event of default on the part of the city but collections could be made from taxes, or tax money.

On the morning of the day of transfer of the property to the city, it is planned to have every car manned by a city employee as it pulls out of the carhouse. The change is to be made with as little interruption of service

as possible. Present Detroit United Railway employees will be retained except where it is necessary to cut down the force. The Mayor favors retaining all platform employees who show that they have the municipal ownership idea of giving the public the best service.

In a statement given out by E. J. Burdick, vice-president and general manager of the Detroit United Railway, he is quoted as saying that it is only fair to all concerned to state that the taking over of the property at the price paid is fully \$10,000,000 below its actual present day worth. The property as it stands, he said, with a reasonable expenditure of money, can be made one of the best going-concern railroads in the country, and with this great undercapitalization and with the fact that it is a good going concern with an excellent organization, there is no reason why the city should not succeed in the venture.

He further stated that had the company in the past been given definite rights, whereby its officials could have gone to the money markets of the world and secured cash to make the reasonable extensions and betterments to the service, many of the arguments that have arisen from time to time could have been avoided. The company officials stand ready to do anything they can to facilitate the undertaking, Mr. Burdick stated.

It is cited that when the systems are combined, Detroit will have the largest municipally owned street railway in the world including 263 miles of track with 1,457 cars and all the necessary equipment.

Funds Provided for Electrification by Stock Authorization

Stockholders of the Illinois Central Railroad at their annual meeting on April 19 approved the issue of \$50,000,000 of preferred stock to finance the Chicago Terminal improvement and electrification work. While no decision has been reached as yet as to the system of electrification that will be adopted, work will begin soon on the lowering of the grade from Forty-third Street to Thirty-first Street and raising the grade from Forty-third Street to Fifty-first. This work is a necessary preliminary to the electrification of the road and will require nearly two years to complete. No decision on the system of electrification will be reached until after A. S. Baldwin, vice-president in charge of the electrification work, has returned from Europe, where he has been studying recent developments in connection with trunk line electrification there. Mr. Baldwin is expected to return the latter part of May.

Check for \$2,934,112 Refused by City

Maintaining its position that the companies have broken the contract ordinances, the city of Chicago on April 10 refused to accept from the Chicago Surface Lines a check for \$2,934,112, representing 55 per cent of the net receipts for the year ended Jan. 31, 1922. This added to the amounts due for the two previous years makes a total of \$6,526,091 which is being held until it is seen whether some compromise can be reached.

It is expected that a fight will be made on the companies' refusal to pay interest on this amount even if the principal is finally accepted. The courts have indicated that the Surface Lines have not broken the contract, and several Aldermen have insisted that the city change its attitude. This money, which now totals about \$36,000,000, can be used only for transportation purposes and it is expected to be a nucleus of a subway fund.

Houston Improvements Started

The Houston (Tex.) Electric Company has started work on its program of improvements and betterments promised under its agreement with the city in return for a sixteen-year extension to its franchise. The traction company is pledged to spend \$1,250,000 within the next two years. The company's first improvements will be the double tracking of the line on Lorraine Street from Gano to Maury, and work has begun on this project. Double tracking of portions of other lines will follow shortly.

The traction company will give "jobless" men who have been working for the city at \$1.25 a day on Hermann Park improvements the first chance when recruiting its construction gangs. Officials of the company made this promise to Mayor Holcombe.

In addition to extensions and improvements already listed, and which have been announced in previous issues of the ELECTRIC RAILWAY JOURNAL, the street car company announced that it intends to purchase thirty-five new cars at once, to put into service as soon as delivered. These will cost \$270,000. Besides this the company will repair and repaint thirty-six of its old cars, which have been stored in the carhouses, and put them to work.

The new car fare system also has gone into effect. Metal tokens are on sale in thirty-eight drug stores and other convenient places. Sixteen are sold for \$1 or four for 25 cents. Half fare tokens are also sold thirty-two for \$1. It is contemplated that tokens will be sold in other places to be added from time to time.

Brooks-Coleman Act Held Constitutional

The Brooks-Coleman act passed by the 1921-1922 Minnesota Legislature providing for regulation of electric railway rates based on true valuations of properties was held constitutional by Judge H. D. Dickinson of the Hennepin County District Court on April 12, in denying the motion of an intervenor in a suit brought by the city of Minneapolis against the Minneapolis Street Railway. The intervenor, George H. Friend, attacked the constitutionality of the law. The judge held that neither fundamental principles of the home rule government of the city nor the constitution of either the state or the United States had been infringed upon by the law. The decision is similar to those handed down previously in Ramsey and St. Louis Counties, at St. Paul and Duluth. John M. Rees, counsel for Mr. Friend, indicated that the case would be taken to the Supreme Court.

In his opinion the judge said that it is to be noted, contrary to popular misconception, that the act does relieve the city of a general control and supervision of the operation of the railway lines. Full plenary powers are reserved to the City Council. The subjects upon which the State assumes control are limited to rate making, supervision of stock and bond issues and the determination of property valuations for certain purposes.

The State Supreme Court has sustained the validity of a similar act by which all local franchises to telephone companies are surrendered and brought under state control through the Railroad & Warehouse Commission. The whole subject is one wherein the Legislature is supreme. The question of state control of public utilities is one of public policy entirely.

Supplementary Report in Paving Case

A supplementary report was issued by the Public Service Commission of Pennsylvania on Nov. 22, 1921, in the paving case of the borough of Swarthmore against the Philadelphia Rapid Transit Company, referred to in the *ELECTRIC RAILWAY JOURNAL* for April 1, page 573. Subsequent to the presentation of the original report in this case, the time during which the order should be held in abeyance was extended, on the petition of the borough, in order that a full opportunity might be afforded the parties to consider and act on the recommendations therein made. In November the commission was advised by the municipality, through its solicitor, that it had decided it would be unwise for it to accept such recommendations, and also that the borough had not adopted any program of highway improvement with respect to Yale Avenue. In consequence of these developments the commission is of the opinion that further consideration of any change in the character of the pavement was a matter that should await the action of

the municipality with regard to the portion of the highway not occupied by the respondent.

The supplementary order of the commission follows:

It is further ordered, That the respondent, Philadelphia Rapid Transit Company, generally maintain and keep in repair that portion of Yale Avenue in the Borough of Swarthmore which lies between its rails and to the end of its ties, so as to be at all times safe to the public and to the employees and patrons of the utility, and so as to make a smooth riding surface over the same for vehicles.

It is further ordered, That the Philadelphia Rapid Transit Company shall not pave or maintain that part of Yale Avenue in the Borough of Swarthmore outside of the railway strip, nor do any other thing specified to be done by it in the ordinances referred to in the commission's original report, nor shall said company pay for the doing of such things by advancement, reimbursement or otherwise unless this commission shall first find and determine that such work or payment shall not prevent or unduly interfere with the ability of the said Philadelphia Rapid Transit Company adequately to perform and properly to meet the duties and liabilities imposed on it by the public service company law.

Terms of Bill Reviewed Authorizing Service-at-Cost

Governor Miller of New York, as noted in the *ELECTRIC RAILWAY JOURNAL* for April 15, has signed the act to amend the public service commission law to define service-at-cost contracts. Under the law as changed municipal corporations having a population of less than 1,000,000 inhabitants and street surface railways are authorized to enter into service-at-cost contracts and the Public Service Commission is authorized to approve and validate such contracts. The provisions of the measure follow:

Section 1. Section forty-nine of chapter four hundred and eighty of the laws of nineteen hundred and ten, entitled "An act in relation to the public service commission and the transit commission, constituting chapter forty-eight of the consolidated laws," as added by chapter one hundred and thirty-four of the laws of nineteen hundred and twenty-one, is hereby amended by adding thereto subdivisions nine, ten and eleven, as follows:

9. Service-at-cost contract defined. A service-at-cost contract is an agreement between a municipal corporation and a street surface railroad corporation, providing generally for operation of a street surface railroad wholly or partly within the limits of such municipal corporation, with a rate of fare directly or indirectly dependent upon the excess of revenues after deductions for operating expenses, maintenance, taxes, allowances for renewal and depreciation and a return on the value of the property used and useful in the service rendered.

10. Authority to enter into service-at-cost contracts. All municipal corporations and street surface railroad corporations now existing or which may hereafter exist have and shall have power to enter into service-at-cost contracts as herein defined.

11. Approval of service-at-cost contracts by public service commission. Any party to a service-at-cost contract, as herein defined, upon ten days' written notice, served in the manner provided by the civil practice act for the service of a summons, to the other party or parties to such contract, may present such contract to the public service commission for its approval. The public service commission shall have the power to approve such contract and any agreement purporting to be such a contract, if entered into between the proper parties subsequent to the first day of July, nineteen hundred and twenty, so presented to it upon filing proof of service of notice of presentation as hereinbefore provided. Upon approval by the public service commission, every such contract is and shall be valid and binding as between the parties thereto as of, from and on the day of the date of the execution thereof, in all respects and for all purposes therein expressed, and no provision of any law, gen-

eral or special, unless the contrary effect shall be specifically stated in any general or special law which shall hereafter take effect, shall or be deemed to interfere with or affect such service-at-cost contract, or any provision thereof, or the performance and carrying out of such contract and each and every provision thereof. The execution of any such existing service-at-cost contract and all acts thereunder are, upon the approval of such contract by the public service commission, validated.

Sec. 2. Application of act. This act shall apply only to municipal corporations having a population of less than one million inhabitants according to the last preceding federal census, anything to the contrary herein notwithstanding.

Sec. 3. This act shall take effect immediately.

Philadelphia Dividends to Employees to Go Into Common Dividend Fund

On April 6 the employees of the Philadelphia (Pa.) Rapid Transit Company, speaking through their elected representatives, enthusiastically endorsed President Mitten's suggestion that the entire 1922 co-operative wage dividend be deposited in a common investment fund, each depositor sharing its earnings in proportion to the amount of his savings so invested.

Following the convention of committee men opportunity was immediately afforded all employees to express their approval of the action of their representatives by signing authorization empowering the trustees of the co-operative wage dividend fund to proceed forthwith along the lines proposed by the president.

Within forty-eight hours more than 99½ per cent of the full personnel of the system had gone on record in approval of the new idea.

In urging the men to the action they have now taken Mr. Mitten said:

Just as I formerly counseled you to deposit your extra wage with the saving fund, so I now urge upon you to turn over the co-operative wage dividend, when paid, to a committee of your own selection, consisting of four trustees who, with the co-operative council, should be empowered to act for you.

The co-operative wage dividend in the hands of your committee should, of course, be subject to withdrawal by any employee who leaves the service, the same as in the saving fund, and in case of death should be paid to the family. Similarly, income derived from investment made with the fund should be distributed to you in cash by the committee.

We are preparing ourselves to act as principals, so that we may participate in profits. To do this, we must keep our co-operative wage fund together, so as to be able to speak with the authority of capital. We must be prepared to take the risk that capital takes in making investment, excepting that our risk will be less for capital, in making its investment, never knows how far it may safely depend upon labor.

Capital has always spoken authoritatively because of its money power. Men and management, with capital added, are stronger than is capital standing alone. We hereby keeping our co-operative wage dividend undivided, can, together, as time passes, more and more effectively function as principals in the hiring of capital, as against the heretofore universal practice of capital hiring labor.

More Turnstiles Ordered.—The New York Transit Commission has given permission to the Interborough Rapid Transit Company to install 43 additional turnstiles in its subway stations. The Brooklyn Rapid Transit Company has also received permission to install twenty-nine turnstiles of different type.

Hearing on the Bacharach Bill Next Week

The House judiciary committee will hold a hearing on April 25 on the Bacharach bill, limiting the jurisdiction of federal courts over the orders of the public service commissions. From indications the hearing will be well attended, many mayors, governors, public service commissioners and other state and city officials having signified their intention of being present.

In addition, representatives of numerous bar associations and public utility corporations are expected to testify against the measure. If enacted into law, public utility companies will lose the right of appeal to the federal courts and must look to state courts for relief from oppressive orders of public service commissions. The prospects for the passage of such a law are regarded as rather dubious by official Washington. The terms of the measure were referred to in the *ELECTRIC RAILWAY JOURNAL* for April 8, page 607.

Railway Employees Must Be Their Own Representatives

C. A. Smith, general manager of the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, recently sent formal notice to the employees that when the existing wage contract expired on May 1 the company would not deal with outsiders in the discussion of a new contract. The letter follows:

You are hereby notified by the Steubenville, East Liverpool & Beaver Valley Traction Company as follows:

1. That on May 1, 1922, at midnight the existing contract under which you are now employed by this company will terminate.
2. That this company refuses to be further bound by any of the provisions of the agreement under which you are now employed by it.
3. That with respect to the further employment of yourself, this company will make up and discuss such further employment with you, or with you and other employees representing yourself or yourself and others constituting the whole number of employees of this company or any part or group thereof at any satisfactory time which discussion may be had with C. A. Smith, but no discussion will be had with any officer or representative of any so-called labor union as the representative of such a labor union.

You are invited at your earliest convenience to take up the matter of further employment with this company as it is the belief of this company that a satisfactory basis for your further employment can be agreed upon.

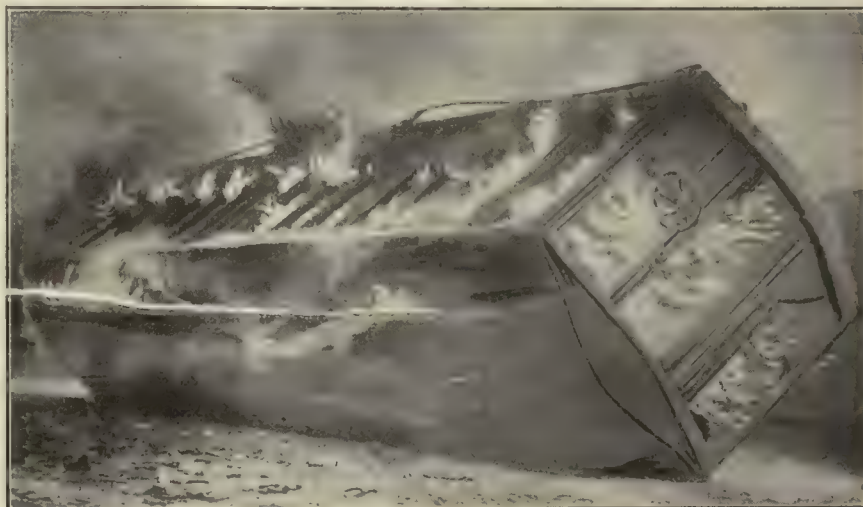
1,850 Old Cars Scrapped and Burned at Boston

Until recently it had been a frequent comment of visitors to Boston that more old style street cars were in evidence there than in any other city of the country. But the last two years of trustee management, with a fare unit adequate to write off obsolete equipment, has changed all that. From July 1, 1919, to Dec. 31, 1921, 1,850 old cars of the Boston Elevated Railway have been scrapped and consigned to the

they have had to keep them. It is only within the last two years that the Boston Elevated has been able to rid itself of the burden of depreciated and inefficient rolling stock.

Most of these old cars had seen twenty-five years of service, and not a few of them three decades. Some were originally horse cars, which were spliced together and equipped with motors when electricity displaced the straining steeds of the '80s. Among the cars destroyed were fifty of the first wooden rapid transit cars used on the elevated lines.

The surface cars destroyed were single and double-truck box cars, 25 and 30 ft. types respectively, also a number of single and double-truck open



CLOSE-UP OF "L" CAR IN FLAMES

flames of a gigantic funeral pyre at the Forest Hills yard. Rolling stock of modern type has replaced these old cars.

Under the strict regulations of the Massachusetts laws and the supervision of the commission, a street railway may not scrap any physical property without writing it off out of earnings. This necessarily involves the use of an actual cash depreciation charge against earnings and few of the companies have been financially able to charge off the value of obsolete cars. Consequently

cars. In their stead, center-entrance multiple-unit cars operated singly and in trains of two and three units are now in service. The company also has put a number of standard one-man safety cars in use in the suburbs.

Before being sent to the Forest Hills yard, the cars to be destroyed are stripped of everything of any possible value, all copper and brass trimmings being removed. After the conflagration, the ashes are raked for iron and metal scrap, which is stored until a favorable opportunity for sale occurs.



CARS BEING BURNED IN BATCHES IN BOSTON

Financial and Corporate

Surplus in Cleveland

Continuous Decrease in Riding with the Maximum Rate of Fare—Increase of Stockholders

According to the annual report of John J. Stanley, president of the Cleveland (Ohio) Railway, the company during 1921 earned expenses, taxes and interest. The number of passengers decreased greatly, but the city lessened the service and the company was able to give the service demanded without suffering a loss. Finishing the year 1921 with an actual profit was due in great part to the fact that the company was collecting the maximum rate of fare under the Cleveland ordinance, to adjustments made in the rates of fare collected in other municipalities, wage reductions in all departments, a lowering of the cost of materials and the slight improvement in general business conditions. The report was referred to in the *ELECTRIC RAILWAY JOURNAL* in the issue of Feb. 11, page 252.

At the close of the year there were 5,808 stockholders, an increase of 277 over 1920. Of this number 5,219 were residents of the state and 3,935 of the county. The report says that the range of prices of the company's stock on the Cleveland Stock Exchange for the past three years, while not indicative of the value of the stock, does emphasize the duty of the city to take some action that will place the market value of the stock above par and maintain it there. In 1919 the range was from 97 to 102; in 1920 from 87 to 100½, and in 1921 from 84½ to 93½. The last sale during 1921 was 86.

The betterments during 1921 were so small that they could be paid for with the money realized from the retirement of obsolete property or, in two instances, paid for by private individuals interested in having them made. In the matter of track renewals the company made a record, completing 28½ miles of track, the largest amount in any year on this system.

On Jan. 1, 1921, the wages of em-

ployees in the maintenance of way department were reduced approximately 20 per cent and employees in the maintenance of equipment department were reduced 10 per cent. On Feb. 1 the wages of all employees except those in the train service and in the above-mentioned departments were reduced 10 per cent. At the same time a bulletin was addressed to the trainmen announcing a reduction of 15 cents per hour and the elimination of all spread and overtime rates. This was followed in March by counter demands of the men and by a series of conferences with their committee during April, but an agreement was reached without recourse to arbitration or without any serious controversy. A new wage scale with the conductors and motormen was made effective on May 1 last which is substantially a 20 per cent decrease over the previous wage scale.

Mr. Stanley quoted at length from a report of City Street Railroad Commissioner Fielder Sanders made to the City Council on Dec. 14, which is a historical review of the past six years of operation and "should be of especial interest to every stockholder for its analysis of the financial and service conditions of the company."

In conclusion Mr. Stanley referred to the death of Henry J. Davies and gave a brief sketch of the man who he said was an authority on the accounting for street railways and on insurance in connection with street railways.

INCOME ACCOUNT THE CLEVELAND RAILWAY BASED ON ACTUAL EXPENDITURES

	1921	1920	Per Cent Change
Passenger revenue*	\$17,336,685	\$17,072,999	1.5
Other transportation revenue	81,536	130,668	-37.7
Other railway operations	189,497	178,691	-6.1
Total operating revenue	\$17,607,718	\$17,382,358	1.3
Way and structures	2,013,810	2,109,294	-4.5
Maintenance car equipment	1,723,407	1,949,887	-11.6
Maintenance power plant	75,630	59,021	21.1
Power operation	1,399,515	1,652,874	-15.3
Conducting transportation	6,037,904	7,042,945	-14.3
General and miscellaneous	2,171,286	2,252,030	-3.6
Obsolete property	494,361	498,000	-0.7
Total operating expenses	\$13,915,913	\$15,564,051	-10.6
Net operating income	3,691,805	1,818,307	103.1
Taxes	1,181,144	1,082,185	9.1
Operating income	\$2,510,661	\$736,122	241.0
Non-operating income	190,229	174,196	9.2
Gross income	\$2,700,890	\$910,318	196.9
Interest and dividends	2,100,732	2,101,239	-0.02
Surplus	\$600,158	\$1,190,921 (d)	150.5
(d) Deficit.			
* Includes employees' passes.			

STATISTICAL INFORMATION THE CLEVELAND RAILWAY

	1921	1920	Per Cent Change
Miles of track operated	411.41	412.71	-0.3
Revenue car-miles—			
Motor cars	31,010,697	33,634,735	-7.8
Trail cars	4,585,813	5,791,397	-20.4
Interurban cars	1,338,195	1,462,086	-8.5
Express and freight, mail, newspaper and chartered cars	183,522	203,022	-9.6
Total	37,118,227	41,091,240	-9.6
Revenue passengers carried	286,844,527	327,840,438	-12.5
Transfers collected	109,110,258	120,156,602	-9.2
Total revenue rides	395,954,785	447,997,040	-11.6
Employees fares	948,717	817,409	16.1
Deadheads	2,526,164	2,111,228	19.7
Total rides	399,429,666	450,925,677	-11.4
Rides per car-mile	10.761	10.974	-1.9
Passenger revenue			
From cash fare passengers	\$16,340,105	\$15,970,086	2.3
From transfers	937,161	1,057,437	-11.4
Total	\$17,277,266	\$17,027,523	1.5
Average fare in cents per revenue passenger*	6.02	5.19	16.0
Average fare in cents per ride	4.34	3.78	14.8
Operating revenue per mile of track	\$42,894	\$42,117	1.8
Operating ratio	79.1	89.2	-10.1
Taxes, per cent of operating revenue	6.72	6.24	0.48
* Including employees' fares.			

Cities Service Utility Properties Do Well

The annual report of the Cities Service Company, New York, N. Y., for 1921, shows net earnings of \$10,846,585. This was 2.23 times the preferred dividend and after deduction of the preferred dividend was equal to \$13.04 earned on the average common stock outstanding, as compared with \$43.09 in 1920. Gross earnings last year were \$13,461,770, as compared with \$24,698,039 in the preceding year. Current liabilities were reduced \$13,375,000.

The earnings of the public utility properties increased 50.8 per cent, or from \$4,609,912 to \$6,918,741. This was sufficient to pay not only all of Cities Service Company interest charges but came within a few thousand dollars of covering preferred stock dividend requirements. With earnings from oil properties a comfortable showing for the common stock was made.

Total current assets as shown in the balance sheet in the report were \$42,438,113, as compared with total current liabilities of \$18,532,347, leaving an ample working capital of \$23,905,766. Accumulated earnings which have not been declared as dividends are shown as \$47,013,011. During the year 11,565,993 barrels of oil were produced, and the company sold 86,133,082,000 cu.ft. of natural gas, 5,849,050,310 cu.ft. of artificial gas, 647,751,497 kw.-hr. of electrical energy and 95,274,280 passengers were carried on its electric railways.

Reorganization Terms Made Public

First Mortgage Bondholders Must Furnish New Cash to Participate in New Company

The Northampton (N. J.) Traction Company as the owner of the stock of the Northampton, Easton & Washington Traction Company, Easton, Pa., is apparently eliminated from participation in the reorganization of the company under the tentative plan which has been drawn by the committee representing the first mortgage bondholders. According to the members of that committee the operation of the Northampton, Easton & Washington Traction Company has shown that it cannot as now constituted earn money sufficient to pay fixed charges on the amount of bonds now outstanding and that it would be unwise again to place upon the company operating the property a burden of fixed charges in excess of any amount which can surely be earned.

In consequence the committee has proposed to allot to the present first mortgage bondholders that portion of the earnings only which remains after payment of operating expenses and taxes and necessary prior fixed charges and after setting aside proper amount for maintenance and depreciation. In order to accomplish this, an income bond has been decided upon as providing perhaps the best means to the end which the members of the committee have in mind.

It is the intention of the committee that the property shall be bid in in its entirety at the foreclosure sale. A new company will then be organized to which the entire property will be conveyed. In reorganizing it will be necessary to raise new money to pay for improvements, refunds, receivers' certificates, and to pay expenses of the committee. As the committee considers it impossible to raise such money from outside sources, the present bondholders will be called upon to subscribe to an issue of \$100,000 of 7 per cent first mortgage bonds. Each bondholder will subscribe to an amount of these bonds equal to 20 per cent of his present holdings. In other words, each

depositor of a \$1,000 bond will subscribe for \$200 of new 7 per cent bonds, for which he will pay \$180.

The proposed authorized capitalization of the new company will consist of \$1,000,000 of first mortgage 7 per cent bonds, \$536,000 of 4 per cent sinking fund income bonds and 2,000 shares of stock of no par value. The amount of securities to be issued at this time will consist of \$100,000 of first mortgage 7 per cent bonds, \$444,000 of 4 per cent sinking fund income bonds and 2,000 shares of no par value stock.

The 2,000 shares of no par value stock will be held by the committee representing the bondholders. Each assenting depositor will receive for each \$1,000 bond and \$180 in cash, \$1,000 of sinking fund 4 per cent income bonds and \$200 of first mortgage 7 per cent bonds. No rights to the income bonds will accrue to any bondholder who does not subscribe for the new first mortgage 7 per cent bonds.

Control of Stark Electric Changes Hands

Purchase of a majority of the stock of the Stark Electric Railroad, Alliance, Ohio, has been made by a syndicate from Alliance and vicinity. The deal, which has been under consideration for several months, was concluded during the week ended April 8. The following Alliance men are interested: W. H. Purcell, F. E. Dussell, A. A. Reeves, S. L. Sturgeon, F. A. Graves, F. A. Hoiles, M. S. Melbourne, A. L. Atkinson, W. E. Davis, E. B. Webb, O. F. Transue, W. H. Ramsey, B. F. Weybrecht, G. R. Floyd and J. F. Heacock. The control of the road has been held by Cleveland capitalists since the organization, twenty years ago.

The Stark Electric Company was organized in 1903. It took over the Alliance Street Railway, the oldest electric road in the country. It first operated a line between Alliance and Canton, and shortly afterward extended the line to Salm. The company at present operates 34 miles of roadway. It owns its own right-of-way except in Alliance and the loop at Canton. The power plant of the company is located at Lake Park east of Alliance.

Renaming and Refinancing

In arranging the refinancing of the Hagerstown & Frederick Railway, Frederick, Md., to meet obligations maturing this year, the name will be changed to the Potomac Public Service Company. Because of its operations extending now into Virginia and West Virginia it is desired to have a corporate name more in keeping with the company's activities and to bring about a closer combination of all its various subsidiaries into one big corporation.

In its new refinancing Hambleton & Company, Baltimore, and E. H. Rollins & Sons, New York, N. Y., will offer \$2,155,000 of the company's first and refunding mortgage 7 per cent sinking fund gold bonds, dated April 1, 1914, and due April 1, 1944. The bonds are offered at 100 and interest yielding 7 per cent.

The bonds are part of an authorized issue of \$10,000,000 and there will be outstanding after this issue \$4,855,000. The bonds are redeemable on any interest date at 107½ up to 1935 and at 2½ less in each succeeding five-year period. The Potomac Public Service Company will have a capitalization of \$1,512,950 in common stock and \$1,625,000 in preferred, which will be used to take over the stocks of its predecessor corporation.

New Directors for Quebec Company

The board of the Quebec Railway, Light & Power Company, Quebec, Que., was largely changed at the annual meeting following the election of E. A. Robert, president of Montreal Tramways, to the presidency. Lorne C. Webster, retiring president, took the vice-presidency and other directors are George E. Amyot, Quebec; Adelard Turgeon, Quebec; D. O. Lesperence, Quebec; J. N. Greenshields, Montreal; H. G. Valiquette, Montreal; Col. J. E. Hutcheson, Montreal; K. B. Thornton, Montreal, and A. C. Barker, New York, and C. G. Greenshields, Montreal. Shareholders approved a by-law making the \$100 par value common stock no par value.

	Latest	Month Ago	Year Ago	Peak	1913
Street Railway Fares*	April 1922 7.14	March 1922 7.14	April 1921 7.22	May 1920 7.24	4.84
Street Railway Materials*	March 1922 156	Feb. 1922 156	March 1921 181	Sept. 1920 247	100
Street Railway Wages*	April 1922 213	March 1922 214	April 1921 231	Sept. 1920 232	100
Steel Unfilled orders (Million tons)	Mar. 31 1922 4.49	Feb. 28 1922 4.14	Mar. 31 1921 6.28	Apr. 30 1917 12.18	5.91
U. S. Bank Clearings Outside N. Y. City (Billions)	March 1922 12.26	Feb. 1922 10.16	March 1921 12.37	March 1920 18.54	6.12
Business Failures Number	March 1922 2,317	Feb. 1922 2,072	March 1921 1,500	Jan. 1922 2,722	1,213
Liabilities (millions)	March 1922 57.51	Feb. 1922 55.32	March 1921 58.78	Jan. 1922 105.7	24.64

Conspectus of Indexes for April, 1922

Compiled for Publication in this Paper

by
Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Peak	1913
U. S. Bur. Lab. Stat. Wholesale Commodities	March 1922 152	Feb. 1922 151	March 1921 162	May 1920 272	100
Bradstreet's Wholesale Commodities	Apr. 1 1922 11.53	March 1 1922 11.60	Apr. 1 1921 11.37	Feb. 1 1920 20.87	9.21
Dun's Wholesale Commodities	Apr. 1 1922 166.3	March 1 1922 169.7	Apr. 1 1921 174.4	May 1 1920 263.3	120.9
Annalist Wholesale food	Apr. 15 1922 182.7	Mar. 18 1922 182.6	Apr. 16 1921 181.9	June 12 1920 329.2	140
U. S. Bur. Lab. Stat. Retail food	March 1922 139	Feb. 1922 142	March 1921 156	June 1920 219	100
Nat. Ind. Conf. Bd. Cost of living	March 1922 154.7	Feb. 1922 157.7	March 1921 168.7	July 1920 204.5	(1914) 100

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over, except New York City, and weighted according to population. Street Railway Materials index is relative average price

of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motor-men and conductors on street and interurban railways in the United States.

Chicago Surface Lines Has Biggest Year

Earnings Largest in History of Companies—Decrease in Riders Small Compared with Other Cities

The report of the Chicago Surface Lines for the fiscal year ended Jan. 31, 1922, discloses gross and net receipts greater than any earned heretofore in the history of the company. The figures are shown in the accompanying table. One of the notable things about the business of the Chicago Surface Lines has been that during the year 1921, when the traffic on many electric railway systems fell off very materially, riding in Chicago decreased only 2.4 per cent as compared to the total number of riders in the previous year. Another interesting item, brought out in regard to traffic is that since 1910 the increase in the number of revenue passengers on all of Chicago's urban transportation systems has been 56.4 per cent, and of this increase 91.52 per cent has been on the surface lines.

In addition to the financial statement of the companies, the report touches very briefly on many operating matters. On the subject of employing trainmen it is pointed out that during the year 10,810 men applied for train service. Of these 4,808, or 45 per cent, were allowed to file applications; of these, 1,114 were tentatively accepted as students, and of these, ninety-eight were rejected by medical examination. A tabulation is included which shows that 101 employees have been in continuous service with the company for forty years or over, 198 for thirty-five years or over, 447 for thirty years or over, and 481 for twenty-five years or over, making a total of 1,227 employees who have been with the company more than twenty-five years.

On July 28, 1921, the department of schedules and time tables was organized as a unit independent of the transportation department and reporting directly to the general manager. The work of this department is to make and revise the time-tables for the ninety-three different lines, nearly all of which require separate time-tables for week days, Saturdays, Sundays and holidays. During the year this department re-

wrote and revised 200 schedules for various purposes.

On the effect of the skip stop on power consumption, the report states that from studies made by the electrical department, it appears that the power saving due to the skip stop is from 15 to 18 per cent, and that if the skip-stop plan were eliminated, the company would not be able to operate the cars without additional power generating, transforming and transmitting equipment.

The power purchased from the Com-

CHICAGO SURFACE LINES — EARNINGS, EXPENSES AND DIVISION OF RESIDUE RECEIPTS FOR TWELVE MONTHS ENDED JAN. 31, 1921 AND 1922

Earnings	1920-1921	1921-1922
Passenger cars.....	\$54,726,740	\$59,706,413
Chartered cars.....	11,591	12,121
Newspaper cars.....	15,745	16,161
Freight earnings.....	3,234	2,319
Hospital car service.....	2,734	4,194
Advertising.....	240,957	247,184
Rents of buildings, etc.....	93,642	106,479
Sale of power.....	98,104	92,371
Interest on deposits.....	112,530	137,939
Miscellaneous.....	22,108	18,553
	\$55,327,385	\$60,343,734
Expenses		
Way and structures.....	\$2,859,901	\$3,040,940
Equipment.....	4,015,806	4,348,373
Renewals.....	4,167,327	4,827,499
Power—maintenance.....	337,093	320,376
Power—operation.....	3,105,975	3,128,792
Conducting transportation—trainmen.....	20,475,132	21,574,699
Conducting transportation—other.....	3,023,872	3,208,603
Traffic.....	9,577	34,547
General and miscellaneous—damages.....	1,930,000	2,271,224
General and miscellaneous—other.....	1,645,711	1,568,098
Taxes.....	1,730,000	2,193,000
Total expenses.....	\$43,300,393	\$46,516,151
Residue receipts.....	*\$12,026,992	*\$13,827,583
Divided		
Chicago Railways.....	*\$7,216,195	*\$8,296,550
South Side Lines.....	*\$4,810,797	*\$5,531,033

* Includes city's 55 per cent of net divisible receipts, as defined by ordinances.

monwealth Edison Company during the year amounted to 540,446,679 kw.-hr. The cost of this purchase power was \$4,046,272. The total direct-current output at substations and power houses was 496,246,165 kw.-hr., the cost of which, including maintenance, fixed charges and purchased power, amounted to \$4,459,102. The highest direct-current peak encountered was for 461,100 amp. on the morning of Jan. 24, 1922.

Another interesting item in the year's review is the mention that Marsh & McLennan were appointed general

insurance brokers for the company at a \$50,000,000 blanket insurance arranged on a new general form covering all buildings and their contents active used in the operation of the road and rolling stock, except the Seventy-seventh Street shops. A \$3,000,000 Mutual Insurance Company policy was continued in force on these shops and their contents and rolling stock. A special insurance policy of \$2,579,613 was placed on buildings and their contents not used in the operation of the road.

The legal expense of the company during the year amounted to 2.87 per cent of the gross earnings, as compared to 3.28 per cent during the previous year.

More Passengers in Boston—General Results Better

The Boston (Mass.) Elevated Railway carried 1,193,657 more revenue passengers last month than during March last year, and revenues exceed cost of service by \$204,332.

During March the total revenue was \$2,868,518, while in the same month last year it was \$2,991,780, a decrease of \$123,262.

The total cost of service last month was \$2,664,186, as compared with \$2,790,932 in March, 1921.

On April 1 the balance in the reserve fund created under the public contract was \$919,863. The Elevated trustees expect that by May 1 this reserve fund will be restored to its original total of \$1,000,000, and after that receipts over cost of service must be paid over to the State to be distributed to the cities and towns that contribute to the loan assessment in 1919.

The number of 10-cent passengers carried last month was 24,765,577 compared with 28,548,059 in March of last year, but this loss was more than made up by the gain in 5-cent passengers, which were 6,130,322 last month and 1,147,316 in March, 1921. The grand total of revenue passengers last month was 30,895,899 and in March last year it was 29,695,375.

It is stated that the receipts for fares per revenue passenger last month were 9.005 cents and the total cost of service was 8.623 cents. Last year in March these figures were 9.804 cent and 9.399 cents, respectively.

CHICAGO SURFACE LINES For the Fiscal Year Ended Jan. 31

Rate of Fare	1915 5 Cents	1918 5 Cents	1919 5 Cents	1920 5 Cents	1921 6 Cents	1922 8 Cents
				2- 1-'19 to 8- 7-'19 7 Cents		
				8- 8-'19 to 11-30-'19 7 Cents, 6 Cents, 6 Cents		
				12- 1-'19 to 12-26-'19 6 Cents	2-1-'19 to 6-30-'19 8 Cents	
				12-27-'19 to 1-31-'20 6 Cents	7-1-'20 to 1-31-'21 8 Cents	
Revenue passengers.....	627,731,550	692,815,889	685,300,718	743,746,584	769,025,413	750,515,6
Passenger receipts.....	\$31,324,038	\$34,566,601	\$34,186,578	\$43,417,639	\$54,726,740	\$59,706,4
Total earnings.....	31,966,046	35,114,633	34,710,098	43,963,438	55,327,385	60,343,7
Operating wages.....	10,560,039	12,854,406	14,768,089	19,854,174	28,204,342	29,676,9
Other operating expenses and taxes.....	9,329,236	10,247,289	10,963,848	13,399,841	15,096,051	16,839,1
Residue receipts.....	12,076,773	12,012,937	8,978,161	10,709,423	12,026,992	13,827,5
Less: Joint account expenses.....	311,894	648,206	478,831	181,862	164,733	449,0
	\$11,764,879	\$11,364,732	\$8,499,329	\$10,527,561	\$11,862,259	\$13,378,5
5 Per cent on purchase price.....	7,113,273	7,661,543	7,802,574	7,893,292	7,974,289	8,024,4
55 Per cent to city.....	2,558,384	2,036,754	383,215	1,448,847	2,138,383	2,944,9
45 Per cent to companies.....	2,093,223	1,666,435	313,540	1,185,421	1,749,586	2,409,5

Tennessee Plan Announced

Bankers Outline the Conditions Under Which Chattanooga and Nashville Properties Will Be Consolidated

Steps are being taken toward the formation of the Tennessee Electric Power Company to effect a consolidation of the companies controlled by the Tennessee Railway, Light & Power Company with the Chattanooga & Tennessee River Power Company. The properties of these companies have been operated as one system, and it is now proposed to bring them together as early as possible into one ownership.

The bankers concerned in the financing state that a sound basis will thus be provided for the funding of current floating debt and for the permanent financing of necessary improvements and extensions to the several properties as required to take care of their growing business. They explain that the first problem presented in making the necessary financial arrangement is to care for the large bonded indebtedness of the present operating companies.

Holders of the Tennessee Power Company's 5 per cent bonds, Nashville Railway & Light Company refunding and extension 5 per cent bonds and Chattanooga Railway & Light Company 6 per cent bonds are being offered their choice of several options in exchange for their bonds. When it is known to what extent such exchanges can be accomplished a supplementary plan will be submitted to the preferred and common stock holders of the Tennessee Railway Light & Power Company, stating the terms on which they may acquire the available securities of the new company in exchange for their preferred and common stock.

Tentative arrangements have been made, conditioned on the plan being declared operative, for the sale of first and refunding bonds of the new company for cash to investment bankers heretofore identified with any of the properties.

It is explained that the Tennessee Railway, Light & Power Company controls the Tennessee Power Company, the Chattanooga Railway & Light Company and Nashville Railway & Light Company. Each of these companies has a floating debt, in some cases large, incurred for necessary betterments and improvements, for which it has been impossible to provide through sale of long-term securities. Because of the inability of these companies to finance their requirements, the Tennessee Railway, Light & Power Company has made large advances to them, borrowing the money for the purpose and pledging as collateral the bonds and stocks of the subsidiary companies held in its treasury, and these obligations have been renewed from time to time. On or before June 1 next there will mature obligations of this company amounting to \$3,561,000, and as collateral practically all of its assets are pledged. In addition the subsidiary

companies have unfunded obligations amounting to \$2,515,907 as of March 1, 1922, nearly all of which mature on or before June 1 next. It is further explained that under the circumstances it is imperative that steps be taken not only to provide for the present obligations of all of the companies, but also to remove the dangers of temporary financing by making provision for permanent financing of the necessary improvements and extensions to the several properties as required to take care of their growing business.

As a result of the careful study of all the conditions the best solution, so the bankers state, is a thorough readjustment of the securities of the company and its subsidiaries and the consolidation of them as outlined in the proposed plan. The details of the basis of exchange of the various securities are, of course, of interest primarily to the holders of the various securities of these companies. The capitalization of the proposed new Tennessee Electric Power Company would be divided as follows: Bonds, \$32,947,500; preferred stock, \$7,914,700; second preferred non-cumulative stock of no par value, 50,000 shares; no par value stock, 150,000 shares.

Taxes Being Paid Up in Muskegon

Forty-three thousand dollars in back taxes will be paid on the installment plan by the Muskegon Traction & Lighting Company, Muskegon, Mich. The company has already paid \$2,000 on account and its installments will be based on the revenue, it is announced by George Steinwedel, president and general manager. He hopes at least to continue the \$2,000 monthly payments as the revenue is increasing.

Owing to bus competition the company lost money in the operation of its cars for two years. It then asked the Michigan Utilities Commission for permission to quit. The state commission made the order but suggested that Muskegon and Muskegon Heights, the two cities served, first vote whether they wanted railway or jitney service. Following a spirited campaign the cities voted four to one for street cars.

The company had been unable to pay its personal property taxes for two years and as soon as the revenue started to increase it decided on the installment plan. Figures submitted showed the buses on competing lines had taken \$80,000 revenue from the railway.

The company is charging a 10-cent cash fare with four tickets for 30 cents.

Last February was the first month in more than three years that the company was able to meet both operating charges and interest. For two years the company is said to have failed by \$50,000 to earn operating expenses.

There had been a marked feeling against the corporation in the two cities, but this sentiment quickly underwent a change when the company asked permission to discontinue service.

Financial News Notes

Opposes Abandonment.—The Bridgeton City Council has adopted a resolution opposing the expressed determination of the Bridgeton & Millville Traction Company, Bridgeton, N. J., to abandon its lines at Bridgeton on July 1 because of the heavy losses sustained.

Receiver Named.—Joseph A. Yager has been named receiver of the Toledo & Western Railroad, Toledo, Ohio. The matter was decided by Federal Judge Killits, acting on the petition of attorneys representing the company's stockholders. He will work with the other receivers, J. Frank Johnson and Harry A. Dunn.

Another Step Taken Toward Reorganization.—The Chicago, Aurora & Elgin Railroad, Aurora, Ill., has applied to the Illinois Commerce Commission for permission to issue \$11,000,000 of common stock for the purpose of acquiring the properties of the Aurora, Elgin & Chicago Railroad under the reorganization plan.

Foreclosure Step Confirmed.—Grayson M. P. Murphy, chairman of the committee representing the holders of the 4½ per cent bonds of the Interborough-Metropolitan Company, has confirmed the report that these bondholders are about to take steps for acquiring by foreclosure the \$33,912,000 of Interborough Rapid Transit Company stock which since 1918 has been held as security for the bonds.

Passenger Decrease Noted.—For the three months ended March 31, 1922, the Philadelphia (Pa) Rapid Transit Company, after deducting charges, realized a net income amounting to \$614,831, against \$364,547 for the same period in 1921. There was a decrease in the traffic from 207,961,020 total passengers for the first three months of 1921 to 202,286,650 for the first three months of the present year. The decrease in passenger revenue was \$386,398.

Prospects for Reorganization Better.—Receiver George Whysall said recently that he had been advised by Judge Merle Walker, Indianapolis, and Guy L. Emerson, Chicago, who represent the bondholders, that they are meeting with thorough co-operation in working out plans for refinancing and reorganization of the Springfield, Troy & Piqua Traction Company, Springfield, Ohio. They expect to be in a position to make a complete report within the next few weeks. At present the line is only in partial operation. Residents along the line have expressed themselves as willing to help in the refinancing move. The Erie Railroad in the past has been used by the road to transfer passengers and freight to and from Springfield and its nearest connection, 2 miles distant.

Traffic and Transportation

Petition for Fare Rehearing Denied

The Illinois Commerce Commission on April 14 denied the petition for a rehearing filed two days before by the Chicago Surface Lines in the 6-cent fare case. The companies have until April 30 to make their next move. It was expected they would seek protection in the courts against enforcement of a rate which they consider confiscatory.

The petition of the companies for a rehearing attacked every conclusion reached by the commission. They contended that the 5 per cent return allowed by the commission would be insufficient to meet even the interest on the outstanding bonds and notes and would prevent them from financing necessary capital improvements. They denied the charge that their operating costs are excessive because the only evidence in the case shows the costs per car-hour and per car-mile were lower than the average for twelve large companies.

The companies insisted that the commission has no authority to set aside the provisions of ordinances as to maintenance and renewal charges and that it would be a grave mistake to reduce these expenditures at a time when the property, built since 1907, is beginning to need more repair and replacement. Also they attacked the section of the order which would prevent further payments into the injuries and damage reserve fund, and they stated the commission has no power to deduct from operating expenses the cost of sweeping, sprinkling and cleaning streets.

The Chicago Surface Lines filed a petition in the United States District Court on April 18 for a permanent injunction against the 6-cent fare order. The plea was made on the ground that the proposed rate is confiscatory. Judge Page set a hearing for next Monday afternoon, at which time he will decide whether he will grant a temporary restraining order to serve until the court can hear the case completely.

Plans Made to Develop Waterway Traffic and Shipment by Electric Railway

The Louisville (Ky.) Railway and the Interstate Public Service Company, the latter operating the interurban lines north through Indiana from Louisville, are destined to play an important part in the revival of Ohio River transportation. President James P. Barnes, of the Louisville Railway, is chairman of the executive committee and director of the new Inland Waterways Company, and Harry Reid of the Interstate is a director. The new corporation is chartered with a capital of \$1,000,000. Plans

call for bringing freight to Louisville from upper river points as far off as Pittsburgh and reshipping or distributing from Louisville by steam and electric railway.

The drawback to river shipping in the past has been found in the fact that so many large plants are located inland. This means that to move the river shipments to these plants after the

materials reach city destination resort must be made to very expensive drayage. However, if plans now being made are worked out to completion it is probable that the Louisville Railway will not only transfer freight from river barges and boats to freight cars for delivery to its interurban lines, but will also transfer to plants located on city car lines.

Through proper co-operation the interurbans will be able to secure materially increased tonnage and will be in position to aid the waterway companies in forcing the steam line to play the game.

Service Restored in Augusta on April 15

Appeal for Relief from Unfair Jitney Competition Heeded, but Company Reserves Right to Withdraw Cars Again if Experiment at Regulation Fails

Electric railway service was resumed on April 15 in Augusta, Ga., by the Augusta Railway & Electric Corporation, after a suspension of just a month. The City Council and Charles S. Banghart, general manager of the company came to terms on April 12 at a special meeting of the Council. The action under which the jitneys will now be regulated was concluded behind closed doors. The agreement was reached after less than an hour's deliberation.

UNDER the agreement Council will so regulate the jitneys that they shall not be permitted to take on or discharge passengers nearer than one block of the street car lines. It will also prevent the jitneys from crossing Broad Street except at the intersection of Broad and Fourth Streets and Broad and Fifteenth Streets. The railway agrees to a 7-cent token fare to be sold in multiples of five, will charge the casual riders 10 cents and sell school children and teachers tickets at 5 cents, as heretofore.

The agreement was reached when Mr. Banghart, representing the corporation, accepted the terms presented in a resolution coming from the finance and special traffic committee of Council. This resolution was amended at the session of Council on April 12 by a substitute presented by Councilman C. Vernon Elliott and was adopted.

The original resolution from the committee and the Elliott substitute follow:

ORIGINAL RESOLUTION

Whereas, in the opinion of the City Council of Augusta it is necessary to further regulate jitneys in the city of Augusta, as a traffic regulation in the exercise of the police power of said city; now, therefore, be it

Resolved, That the police committee of the City Council of Augusta be, and it is hereby authorized and directed to so regulate the jitneys now licensed by the City Council of Augusta as that they shall not be permitted to take on or discharge any passengers nearer than one block of any street car line of the Augusta-Aiken Railway & Electric Corporation, and further to so regulate said jitneys as to prevent their crossing Broad Street, except and alone at the intersection of Broad and Fourth Streets, Broad and Twelfth Streets and Broad and Fifteenth Streets.

(Amended)

SUBSTITUTE RESOLUTION

Whereas, in the opinion of the City Council of Augusta it is necessary to further regulate jitneys in the city of Augusta as a traffic regulation in the exercise of the police power of said city; now, therefore, be it

Resolved, That the police committee of the City Council of Augusta be, and it is hereby authorized and directed to so regulate the jitneys now licensed by the City

Council of Augusta, as that they shall not be permitted to take on or discharge any passengers nearer than one block of any street car line of the Augusta-Aiken Railway & Electric Corporation, and further to so regulate said jitneys as to prevent their crossing Broad Street, except and alone at the intersection of Broad and Fourth Streets and Broad and Fifteenth.

2. Resolved further, That in restarting its cars the status quo ante existing between the city and the Augusta-Aiken Railway & Electric Corporation, with respect to the rights, privileges, duties and obligations belonging to or imposed upon either the city or the company, shall be and remain the same as they were prior to March 15, 1922, provided nothing herein contained shall be construed as in any way enlarging the franchises granted to said railway company prior to March 14, 1922.

Adopted in open Council, this the 12th day of April, 1922.

In a letter to the Council dated April 12, Mr. Banghart agreed that if the Council passed the resolution presented to him the company "will assure the public that it will resume service in the city, charging 10 cents for the casual rider and will sell tokens at 7 cent in multiples of five, and sell school children and teachers tickets at 5 cents as heretofore."

Furthermore, the company agreed to resume and maintain not more than fifteen-minute schedule or headway on all city lines. The company also agreed to maintain a seven-and-one-half-minute service on the Summerville line as far as Baker Avenue during the morning and afternoon rush hours.

Mr. Banghart indicated that the company was willing to try to operate under the conditions just outlined, but that it was obvious that it could do so successfully only with the full cooperation of the riding public. The company has pledged itself to do its best to make operation a success under the new conditions, but that it must remain free to exercise its legal right and to stop cars again if after a reasonable trial the jitney competition is regulated under the new order still cut into the railway company's legitimate revenue as reflected in the operating receipts and expenses.

New Loop Plan Suggested

The Board of Control of Steubenville, Ohio, in co-operation with various committees of the City Council has submitted a new loop plan to the City Council for all rail traffic within the city. The new loop plan eliminates five "dead-end" terminals in the city business district, provides for continuous operation of cars on all lines with elimination of loss of time for passengers and congestion on busy thoroughfares, makes Market and Adams Streets "one-way" streets for electric lines and in the opinion of officials, as near as is humanly possible, remedies inconvenience to the traveling public and congested traffic. Under the new plan, which is said to meet with the approval of the operating companies, universal transfers on all lines will be issued.

City Fathers Allow One-Man Cars

One-man cars, of the Birney type, similar to those which have been so successful in Tampa, will be permitted on the lines of the Jacksonville (Fla.) Traction Company, following the decision of the city fathers there to accept the recommendations of the laws and rules committee of the Council. The decision amends Section 5 of the existing ordinance which says that there shall be a conductor and motorman on each car.

The Jacksonville Traction Company, a Stone & Webster subsidiary, and now in receivership, had requested the city to eliminate that section of the ordinance regulating electric railway traffic that requires that a car crew shall consist of a conductor and a motorman.

According to E. J. Triay, receiver for the Jacksonville Traction Company, the installing of one-man cars in Jacksonville will not mean that the number of carmen now employed by the traction company will be reduced. The men will merely be assigned to different cars, thereby increasing the car service.

Hopeful That Traffic Will Increase

The maximum decline in the number of passengers transported by the Cincinnati (Ohio) Traction Company has passed, according to William Jerome Kuertz, Director of Street Railways, who has just completed compilation of figures for the first three months of 1922. Director Kuertz said that while the number of passengers was less for the first three months this year as compared with last year, the bottom of the depression has been reached and the trend is upward.

In January this year there were 8,932,704 revenue passengers as compared with 9,093,024 in January, 1921. In February, 1922, there were 8,071,061 and in February, 1921, 8,208,261. March showed an increase to 9,098,342. In March, 1921, the number was 9,238,402. Director Kuertz said that the percentage of difference is being overcome

from month to month and at the present rate the traction company will exceed last year's figures and will be on a fair way to equalizing the record of 1920.

Hearing on Lower Fare—Decision Reserved

James T. Manee was the only signer of the petition to the Public Utilities Commission for a reduction of fares at Hartford, Conn., to 5 cents who appeared at the hearing on April 18 in the Capitol in support of the petition. The Connecticut Company was represented by President Storrs and Attorney Joseph Berry. Commissioner Elwell conducted the hearing alone. The commission reserved its decision.

Mr. Manee declared the people of Hartford did not consider the three-tokens system a satisfactory substitute for a flat rate of 5 cents. He knew that the commission had given consideration to the 5-cent proposition and he did not come to the hearing with figures in support of the petition. He would not favor the petition if the granting of it would have a tendency to reduce the wages of the trolley company's employees. The people traveling on the cars felt that a 10-cent fare was burdensome.

President Storrs said that before the war the payrolls of the company amounted to \$4,000,000 annually. At the present time the payrolls amount to \$7,000,000. Coal and materials have doubled in price. A 5-cent fare was beyond a possibility. By the reduction of fares in Hartford 16 per cent the company contributed \$50,000 in the month of March to the cost of living in Hartford. About 90 per cent of the people of Hartford took advantage of the reduction by buying tokens.

Emergency Ordinance Passed

The City Council of Akron, Ohio, on April 18 passed an emergency ordinance granting the Northern Ohio Traction & Light Company a 5-cent fare until the expiration of the present 4-cent fare franchise Feb. 1, 1924. The new franchise provides that the company must lay tracks on North Main Street over the North Hill Viaduct, on a portion of West Market Street, and install eight new buses as feeders to present traction lines. The ordinance provides the work must be completed with ninety days after the company is notified.

The company has been receiving a 5-cent fare under ordinances passed from time to time for the last year and a half. The passage of the present ordinance clears the situation for an agreement. It is expected that a permanent contract will be agreed upon during the next few months. While the franchise passed is subject to a referendum within the next sixty days, it does not appear at this time that a referendum will be called for the reason that the public attitude toward the company is such that a referendum would merely ratify the action of the Council.

New Service to Start

Arrangements have been completed for a two-hour through limited inter-urban service between Akron and Warren, Ohio, to begin May 1 over the Northern Ohio Traction & Light Company and the Cleveland, Alliance & Mahoning Valley Railway lines with connections at Ravenna for Alliance. Tickets will be sold through from Akron to Youngstown, using the Pennsylvania-Ohio Electric line beyond Warren, where transfer will be necessary for the present.

The first train leaves Akron Terminal, eastbound, at 6:50 a.m. and every two hours until 4:50 p.m. The first train leaves Warren, westbound, at 6:45 a.m. and every two hours until 4:45 p.m. The schedule running time is one hour and fifty minutes each way. New steel cars will be used.

Trains will stop at Chalkers Landing, Cuyahoga Falls, Silver Lake, Kent, Brady Lake, Ravenna, Wayland, Newton Falls, and Leavittsburg. Eastbound trains stop only at Wayland and Leavittsburg to discharge passengers, while westbound trains stop at these two points only to pick up passengers.

Will Report Traffic Violations

A number of traffic changes are in the making at the present time in Louisville, Ky. One act which will probably be passed will prohibit autos passing street cars on the left side when both auto and vehicle are moving in the same direction. Just recently there was a bad smash when an auto was caught between two cars moving in opposite directions and three people have been in the hospitals for some time as a result. An ordinance prohibiting parking for more than fifteen minutes in the downtown district is now before the board.

Through the efforts of the Louisville Safety Council and the Automobile Club several hundred prominent men, including many motorists, have been appointed members of the Citizens' Police Auxiliary Committee, these members reporting all traffic violations which they see, especially cases where automobile owners pass standing street cars. Members of the auxiliary committee have received fresh identification cards.

Hearings Started.—High percentages of overloading during the rush hours on the Myrtle and Marcy Avenues stations and on the Canarsie line were disclosed on April 17 when the Transit Commission began its investigation of service on the subway and elevated lines of the Brooklyn Rapid Transit Company. Statistics were presented by W. K. Edgerton, the commission's assistant supervising inspector. Clarence J. Shearn, chief counsel to the commission, said that conditions would be different if the city had put the Fourteenth Street Eastern District subway in operation. The investigation was adjourned until April 24.

"Weekly Pass" in Meadville, Pa.

You can now ride whenever you like and as often as you like in Meadville, Pa., for \$1 a week. The new arrangement, which is the "weekly pass" plan, is the result of a conference between a committee appointed by the Chamber of Commerce and Charles M. Hatch, vice-president and general manager of the Crawford County Railways, operated under lease by the Northwestern Pennsylvania Railway. Mr. Hatch recently wrote to the Chamber of Commerce stating that owing to the decrease in riding the company was considering some way of readjusting the rates or increasing the traffic in the city. A committee was then appointed and at a conference held on March 30 it was brought out that the business of the company had decreased 20 per cent below the same months of 1921 and that the company proposed to put on sale a reduced ticket rate.

The 10-cent cash fare or ticket plan will still be in effect. It is said that the tickets are transferable but are not good on interurban cars. This "weekly pass" plan is the same as in effect in Youngstown, Fort Wayne and other cities of moderate size.

Extension of Freight Service Announced

A new avenue for the shipment of freight to and from Cleveland, Akron, Massillon, Canton and other points has been opened by the Northern Ohio Traction & Light Company, Akron, Ohio. Through the establishment of this service there will be an early morning distribution of freight from Cleveland to all points on the Northern Ohio Traction & Light, Mahoning Valley, Pennsylvania-Ohio Electric, Stark Electric and other roads with which negotiations are now in progress. Arrangements have also been practically completed for the handling of freight from every point on the Northern Ohio Traction & Light to other cities and states via several steam lines. Rates will be the same as on steam roads.

A freight house has been established at 725 Eagle avenue, near Ninth street and Euclid Avenue, which is in the center of the city's business district. Northern Ohio Traction & Light cars will be switched to this freight house and loaded. The extension of freight service has necessitated the establishment of new freight depots, outside of Cleveland, in Ravenna, Barberton, Massillon, Dover and New Philadelphia.

Petition for Lower Rates

J. P. Jones has filed a petition with the Georgia Railroad Commission asking for a reduction of the fares to 5 cents on the Rome Railway & Light Company's lines. Various charges are made against the railway in the petition, which states that after the reductions are sought in railway fares and in light and power rates it would still be possible for the company to

earn fair returns on the capital invested. The petition was filed in Atlanta and May 26 has been set for the hearing by the commission.

Transportation News Notes

Will Determine Fares.—The City Commission of Fort Smith, Ark., has promised a thorough investigation of the earnings of the Fort Smith Light & Traction Company for the purpose of determining whether the company is to return to a 5-cent fare.

New Plan to Become Effective.—The skip-stop system will shortly be started on electric railway lines in Oklahoma City, Okla. Announcement to this effect was recently made by J. W. Shartel, vice-president of the Oklahoma Railway. The skip-stop plan is already in use on one of the Oklahoma City lines.

Will Appeal Rate Decision.—The Nashville Interurban Railway, operating between Nashville and Franklin, Tenn., has announced through its officials its intention of appealing the decision of the Public Utilities Commission in regard to its rates. The order of the commission reduced the passenger rate from 10 cents to 4 cents.

Five-Cent Fare Orders Issued.—Officials of the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, recently announced the return of the 5-cent fare on local lines. The lower rate instead of the three-fare zone system is the result of a decision of the Federal District Court.

Merchants Oppose Rates.—Merchants of Wheeling, W. Va., working with a committee of the Chamber of Commerce, are planning to take action soon to force a reduction in rates of the Wheeling Traction Company and the Wheeling Public Service Company. Retail merchants claim that the alleged high rates keep out business from the Ohio district.

Interurban Adopts Daylight Saving.—Despite the fact that the city of Springfield, Ohio, rejected a proposal to establish daylight saving in the city at a referendum, last fall, the Indiana, Columbus & Eastern Traction Company will operate trains on the advanced time effective April 30 to Oct. 1. Springfield is one of the few cities on the traction line that does not operate on advanced time during the summer months. Moreover, connecting lines operate on Daylight Saving time during the summer.

Use of One-Man Cars Being Extended.—One-man cars have been introduced by the International Railway, Buffalo, N. Y., on several local lines in the city of Niagara Falls and there has

been an extension of the one-man car service in Buffalo. The company has been operating one-man cars in Lockport for several years. In Niagara Falls, where the company had been operating cars on certain lines on a forty-minute schedule, one-man cars are being operated under a twenty-minute headway.

New Rules for Car Operation.—Under a new ordinance adopted by the City Commission of Trenton, N. J., electric railway companies operating within a radius of three-quarters of a mile from the center of the city of Trenton are prohibited from allowing cars to stand for a longer period of time than is reasonably necessary for receiving and discharging passengers. Trolley companies are also prohibited from allowing two cars to stand side by side at any terminus for any period of time whatsoever.

Zone Ticket Machine to Be Installed.—Shanklin Equipment Company, Springfield, Mass., has contracted with London Tramways, Ltd., to supply a machine for issuing zone tickets and adding fares automatically, and the first lot of machines was shipped to England, April 14. The use of the machine is said to be an experiment and the outcome will have a bearing in determining if it is feasible to install one-man tram cars to replace the buses so extensively in use in that city. Alfred L. Chase, chief of the Shanklin Company's mechanical organization, is going to London to install the machines.

Contract with Public Trustees Must Stand.—Attorney-General J. Weston Allen of Massachusetts has rendered an opinion in which he declares unconstitutional some fourteen bills submitted to the Legislature by residents of Boston having for their object the restoration of the 5-cent fare on all lines of the Boston Elevated Railway and the Eastern Massachusetts Street Railway. According to Mr. Allen the contracts must stand which were made in 1918 providing for the operation of these roads under a board of public trustees. The bills were introduced as a result of the pre-election promises of Mayor Curley.

City Will Take No Action.—Announcement has been made that no action will be taken by the city of Erie, Pa., in the matter of the recent ruling of the Public Service Commission in refusing to make mandatory recommendations for a reduction in fares in the city until official notice of the ruling has been received by the city. The Public Service Commission over a year ago recommended that fares on the Buffalo & Lake Erie Traction Company be reduced in the city. Such recommendations have been ignored by the company and the council petitioned the commission to make the recommendations mandatory. The Public Service Commission has declined to do this, on the ground that the operating expenses of the company are such as not to permit a reduction in fares.

Personal Mention

Oscar Terry Crosby

Germans Listen Attentively to Outspoken American Who Advises Them to Clean House Financially

Oscar Terry Crosby, publicist, economist, explorer, engineer and electric railway executive, has been indulging in his favorite pastime again. He has been on another investigation. Mr. Crosby is always investigating somebody or something. The difference between Mr. Crosby and your ordinary investigator is that when Mr. Crosby investigates anything he goes to the bottom of it, with permanence in view as the outcome of such recommendations as he may make.

Just now Mr. Crosby happens to be in Germany, but he would be equally at home most anywhere else in the wide world. According to newspaper accounts, the former Assistant Secretary of the United States Treasury—for this is one of the many posts Mr. Crosby has held—has startled the German optimists by the candid manner in which he set forth the conditions which any conservative leader would obviously impose before diverting his capital to the field of government or large private loans in Germany. But that isn't all. Among other things he has proposed to the Germans a determination of the theoretical value of the paper mark, based on the average index figures and exchange rates during the era of inflation.

The Germans are not the only ones Mr. Crosby has shocked. He does not think that others have been very much nearer to being correct or less free from economic sins than have the Germans. He is of the opinion that the Reparations Commission has been negligent in making demands without requiring the one step which would permanently put its debtor in a position to make orderly payments in the future. This step, he explains, is the establishment of sound currency. His plan is one of the fruits of his direct study on the ground, but has its real basis on knowledge gained previously.

It will probably be recalled that Mr. Crosby was formerly resident manager in Belgium of the work of the American Commission for Relief in Belgium and Northern France and that late in December, 1917, he represented the United States at a meeting of representatives of all the Allies held in London to discuss the industrial and economic situations. And thus it goes.

Money has been a means to the end with Oscar Crosby, never the end. Long before Edward Bok and others began to preach the doctrine of letting younger men take over the active reigns of business, Mr. Crosby had put aside all thought of active participation in

business affairs in order that he might devote himself to his avocations and to the public service. The safe guess would be that Mr. Crosby has worked harder since 1914, when he entered the public service, than he ever did before. That, indeed, is saying a great deal when proper weight is given to the many business interests of the man in the pioneer days of the electric railway industry. Mr. Crosby is in many respects a marvel. That sounds big and imposing. Well, it is meant to sound that way. And what is more, it is a fact.

Enter Safety Director Koehler

A. W. Koehler has been appointed director of safety of the New York State Railways. He is a newcomer in



A. W. KOEHLER

the electric railway field, but he has had an extended and successful experience in safety work. For two years previous to joining the staff of the State Railways Mr. Koehler was executive secretary of the Rochester Safety Council, which is affiliated with the National Safety Council. During the previous five years, with the exception of a period of war service in the engineering department of the Navy, he was engaged in safety work with the Commonwealth Steel Company, Granite City, Ill., and the Atlantic Steel Company, Atlanta, Ga.

Mr. Koehler graduated in mechanical engineering from Purdue University in 1915. His experience since graduation has convinced him that the field of industrial accident reduction is a promising one for young engineers. He visualizes a great opportunity on the New York State Railways, in spite of the fact that that company has been one of the pioneers in this field.

P. L. Hatch is now general manager of the Glendale & Montrose Railway, Glendale, Cal. He was formerly superintendent and purchasing agent.

F. W. Gerlach has been appointed general agent of the newly created freight department of the Northern Ohio Traction & Light Company, with headquarters in Cleveland. C. J. Laney, traffic manager, will have complete supervision over the new department.

Harry Reid, president of the Interstate Public Service Company, which owns and operates the Indianapolis, Columbus & Southern Indiana Traction Company and other public utilities in Indiana, has been elected president and also a member of the executive committee of the Great Lakes division of the National Electric Association. The Great Lakes division is made up of Illinois, Wisconsin, Michigan and Indiana. The division will hold its annual convention at French Lick in September.

C. D. Cass, general manager of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, some weeks ago addressed the annual convention of the Iowa Engineering Society at Sioux City on the steam railway situation. Mr. Cass was one of the managers under federal operation during the war and knows the difficulty now faced by the railroads. He said the roads are so hedged about by restrictive regulations and regulatory bodies that they do not and cannot respond promptly enough to economic changes and conditions. He pointed out that the railroads are subject to a host of masters—the United States Congress, the Interstate Commerce Commission, forty-eight state legislatures, forty-eight state railroad commissions, hundreds of county governments, thousands of city governments, untold numbers of health officers, township trustees, highway commissions, road supervisors, and what not—because each of these governmental agencies has the absolute power to compel a railroad to make expenditure of money under authority of law. The address was well received.

Obituary

William J. Armstrong, assistant treasurer of the Gould Coupler Company, New York, died suddenly at his home in Brooklyn some time ago. Mr. Armstrong had been connected with the company for the past twenty-five years.

John H. Campbell, treasurer of the Interborough Rapid Transit Company, the Interborough Consolidated Corporation and the New York Railways, New York, N. Y., died April 5 at Garden City, Long Island. Mr. Campbell gained political importance during the régime of Richard Croker, and served as his private secretary when Mr. Croker was Tammany leader. For some years before he became secretary of the traction companies, Mr. Campbell was deputy city chamberlain, leaving that work in 1908 to take up his duties with the Interborough.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

Railway Business Is Increasing

We find it necessary this week to devote more space than usual to information on business and market conditions. Reports of track reconstruction and extension have been increasing daily and purchases for power and rolling stock equipment indicate a steady increase. Reports from the Department of Commerce on foreign conditions show an increased demand for American products, and in other closely allied lines there is indication of a continued though slow resumption of business.

Some Figures on Coal Production

Complete returns of coal loaded into cars at the mines indicate that production during the first week of the strike was 3,784,000 net tons of bituminous coal and a few cars of anthracite dredged from the rivers. The total production of all coal was 3,793,000 net tons. In the first week of the great strike of 1919 only 3,582,000 tons of bituminous coal were produced, but at that time the anthracite mines were working to capacity and produced 2,008,000 tons. The total production of all coal in the first week of the 1919 strike was therefore 5,590,000 tons. Preliminary telegraphic returns for the present week indicate no change in anthracite, but a slight decrease in the output of bituminous coal.

The current production is less than the districts now at work are able to produce when the demand for coal is active. It is true that a number of important non-union mines in the Connellsville coke region and in central Pennsylvania have been closed by the strike, but the existing demand is not sufficient to call out full production in those districts remaining at work. From mines in many non-union fields reports of "no market," "dull demand" and "unbilled coal" continue to be received. The number of loaded cars unconsign'd at the mines was very large when the strike began, but the latest reports from the railroads show that it is increasing rather than decreasing.

New Director of Industrial Relations for Schenectady Plant

G. H. Pfeif, has been appointed director of industrial relations at the Schenectady plant of the General Electric Company, succeeding E. B. Merriam, who recently became executive engineer of the Switchboard Department. As director of industrial relations he will have supervision over the employment, education and training, compensation, hospital and safety work of the Schenectady plant.

Mr. Pfeif has been with the General Electric Company since 1905 and for the past several years, as secretary of the committee on student affairs, has been in charge of the selection and placement of technical graduates in the student engineering courses of the Company.

Railway Electrification in Switzerland

The general management of the Swiss Federal Railways has requested the Administrative Council to approve of the plan for electrification of the Lucerne-Olten-Bale line (92 km.) and to provide it with a credit of 28,300,000 francs to purchase the necessary installations, materials and tools. The management also requests that it be permitted to alter the present construction plans at its own discretion whenever the present credits might be greatly surpassed.

German Rails and Steel Poles for Edinburgh

The Edinburgh Tramways Committee, by a majority, has recommended the acceptance of the quotation of a German manufacturer in Cologne for 130 tons of tramway rails and 5 tons of fish-plates. The German firm quoted, through its British agent, £1,365, and the nearest British offer was £1,495. The German figure, on a basis of \$4.40 to the pound sterling, would be equivalent to \$33.37 a ton.

The Edinburgh committee also unanimously agreed to accept the tender of another German firm for steel poles. The British quotation was £7,977, as against £5,436 by a Düsseldorf firm.

More Electric Railway Extensions Planned for London

Late developments of the project for certain extensions and improvements of the London Underground Railways show that the trade facilities committee of the government has reported favorably on the plans which have been proposed and has recommended that the government guarantee the principal and interest upon a sum not exceeding £5,000,000 for this work. Press comments state that there is every reason to believe that the recommendation of this committee will be accepted and that the guarantee will be given. A survey of the situation is being made for the U. S. Department of Commerce by a representative at London of the Bureau of Foreign and Domestic Commerce, and further details relative to the commencement of this work are expected soon.

Western Electric Reports Earnings of \$10,166,337

The net earnings of the Western Electric Company in 1921 were \$10,166,337, compared with \$8,277,414 in 1920. This increase in the face of drop in gross sales from \$206,112,000 in 1920 to \$189,765,000 is attributed to a thorough readjustment and reduction of expenses. The balance carried the common stock after payment of interest and dividends was \$823,990. The unfilled orders of the company Dec. 31, 1921, aggregated \$75,525,000 as compared with \$82,655,000 at the end of the year 1920 and \$47,442,000 at the end of the year 1919.

C. G. Du Bois, president, says:

A survey of the prospects for 1922 indicates that the business in the company's products will be about the same in quantity as 1921, but somewhat less in monetary value, due to the lower price level which the product will be sold.

Rapid Transit Proposals Made in Los Angeles

The Pacific Electric Railway, Los Angeles, Cal., has just made application to the City Council for a franchise to operate trains through a tunnel which it is proposed to bore between Hill Street Station and Glendale Boulevard. According to reports, work on the project can be started immediately after the granting of a franchise. It is expected that two years would be necessary to complete the work.

The proposed tunnel will cost approximately \$1,850,000 and will be approximately 1 mile in length. Such a tunnel will remove a car a minute from the North Hill Street line, where conditions are very congested. At the same time the scheduled speed could be increased considerably and at least fifty grade crossings would be removed.

Railway Electrification in Java

The estimates made in the Netherlands Indian budget for the electrification of the railways of Java have been accepted, but no time has been set for the beginning of the work. A German concern has recently sent a special representative to Java for the purpose of studying the plans and making competitive bids on machinery and the necessary supplies.

Metal, Coal and Material Prices

Metals—New York		April 18, 1922
Copper, electrolytic, cents per lb.	12.87	
Copper wire base, cents per lb.	14.12	
Lead, cents per lb.	5.12	
Zinc, cents per lb.	5.25	
Tin, Straits, cents per lb.	31.12	
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	\$4.75	
Somerset mine run, Boston, net tons	2.25	
Pittsburgh, mine run, Pittsburgh, net tons	2.50	
Franklin, Ill., screenings, Chicago, net tons	2.75	
Central, Ill., screenings, Chicago, net tons	2.50	
Kansas screenings, Kansas City, net tons	2.50	
Materials		
Rubber-covered wire, N. Y., cents per lb.	5.90	
Weatherproof wire base, N. Y., cents per lb.	15.50	
Cement, Chicago net prices, without bags	\$1.97	
Linseed oil, (5-bbl. lots), N. Y., cents per gal.	88.00	
White lead, (100-lb. keg), N. Y., cents per lb.	12.25	
Turpentine (bbl. lots), N. Y., cents per gal.	86.00	

Rolling Stock

West Penn Traction & Water Power Company, Pittsburgh, Pa., during 1921 added nine cars of double-truck type to the Coke Region Division rolling stock and ten cars of the double end double-truck type to the McKeesport Division.

Western Ohio Railway, Lima, Ohio, has purchased ten new passenger cars lighter than cars now used. The new equipment will cost \$250,000. General Manager Carpenter stated that later on, to meet competition of the motor bus, the Western Ohio will place in service passenger buses on the highways.

Pittsburg County Railway, McAlester, Okla., which owns and operates the electric railway lines in McAlester and also the electric railway from McAlester to nearby towns, has purchased and put in operation a new type of electric locomotive, built especially for its line at a cost of \$25,000.

Chicago, North Shore & Milwaukee Railroad has requested bids on twelve new single-truck safety cars, ten merchandise dispatch cars and ten steel passenger coaches, all of which will be motor cars. There is a possibility that a larger number of cars may be ordered and that the specifications as to types of cars to be purchased may be changed. Types of equipment, and passenger car design, are under study and investigation at the present time.

Power Houses, Shops and Buildings

Toledo & Indiana Railroad, Toledo, Ohio, has purchased a site at Washington and Ontario Streets, Toledo, and will soon build there an interurban freight station. President L. P. Schenck has announced that the move was made necessary because of the indefiniteness of the present leases for the interurban union freight station in the downtown district. The Ohio Electric will use its own interurban station. Two or three other lines are negotiating for the right to use the Toledo, Bowling Green & Southern freight station, and some lines may also want to enter the Toledo & Indiana station for their freight business.

Holyoke (Mass.) Street Railway may have a joint waiting station with the Boston & Maine Railroad. At a hearing before the Holyoke Board of Public Works on March 11 on a petition to abolish the Boston & Maine passenger and freight stations at Smith's Ferry, the feasibility of this plan was considered. A plan to establish physical connection between the tracks of the two companies at this point is also under discussion. This would enable cars to be run from a nearby quarry onto the Boston & Maine without transferring the loads. Several plans to reduce the dangers arising from the grade crossing were considered.

Brooklyn, N. Y.—The \$342,000 bid of F. L. Cranford for the construction of the Lawrence Street subway station on the Whitehall Street line of the Brooklyn Rapid Transit Company was found to be the lowest when the bids were opened before Leroy T. Harkness, a member of the Transit Commission. The terms of the contract provide that the station must be ready for operation in eighteen months from the time work is begun and must be entirely completed in twenty-four months. Work is to begin within thirty days of the date of the delivery of the contract. The bid next lowest was that of the Joslin Construction Company, \$355,000. The highest was that of Pat McGovern, \$502,000. There is already a platform at Lawrence Street, but it has never been used.

Track and Roadway

Montreal, Que.—At a recent meeting of representatives of the City Council and the Tramways Commission it was definitely decided to build a car line to the top of Mount Royal.

San Francisco - Oakland Terminal Railways, Oakland, Cal., has protested the extension of its Rockridge line on the ground that this improvement would necessitate a new switch at a cost of \$5,000.

The Poughkeepsie & Wappingers Falls Railway, Poughkeepsie, N. Y., is planning a program of improvement work on its lines in the city. Double tracks will be laid on some streets.

Georgia Railway & Power Company, Atlanta, Ga., will spend \$220,000 on improvement work. On Marietta Street 122-lb. rail will be put in and 103-lb. rail on Decatur Street. These rails will be laid in a concrete roadbed.

Cincinnati (Ohio) Traction Company will start the work of putting in new rails on Hamilton and Eastern Avenues on May 1. These thoroughfares are equipped with double tracks and the new rails will be laid for a distance of 1 mile on each street.

Eastern Pennsylvania Railways, Pottsville, Pa., replaced much new track during 1921 and built a new siding at Port Carbon. Some of the overhead trolley wire was also replaced. During the year \$399,719 was expended for improvements and extensions to the property.

Winona Interurban Railway, Warsaw, Ind., operating from Goshen, Ind., to Peru via Warsaw, is building a track connection with the Michigan division of the Big Four railroad at New Paris, 6 miles south of Goshen. The arrangement will also afford connection with the Wabash Railroad at that place.

Steubenville, Ohio.—Plans for a loop system for all traction lines in Steubenville have been mapped out by the city board of control and safety and street committees of Council. The idea is to route all city lines on a loop embracing Sixth, Adams, Third and Market Streets.

Inter-City Terminal Railway Company, North Little Rock, Ark., will formulate plans for laying tracks on the new Main Street bridge, which is being constructed to facilitate traffic between Little Rock and North Little Rock. The proposed improvements will cost about \$150,000.

New York, N. Y.—The Transit Commission is planning to build a subway from Long Island City to Borough Hall and to extend the Fourth Avenue subway to Staten Island. George McAneny, chairman of the commission, recently made this announcement before the Brooklyn Chamber of Commerce.

Shenango Valley Traction Company, Youngstown, Ohio, will begin work on the double tracking of its line on Broadway, Farrell and South Dock Streets, Sharon. Where necessary, the present double-track section will be rebuilt so that there will be a continuous double-track system. The rail used will be grooved girder. It will be laid on International twin steel ties.

Public Service Railway, Newark, N. J., is preparing plans for extending its lines to the proposed bridge plaza at Camden, where a structure will be erected across the Delaware River. The railway is waiting to hear from the bridge engineers before deciding on a loop or otherwise at the bridge approach.

Little Rock Railway & Electric Company, Little Rock, Ark., may be required to place its wires underground at the foot of Broadway Street, so that the work of constructing the new bridge across the river at this point may not be interfered with, according to a recent City Council resolution. The work will cost about \$7,000.

Altoona & Logan Valley Electric Railway, Altoona, Pa., will soon start work on double-tracking the Eighteenth Street line between Eleventh Avenue and a point between the culvert and Nineteenth Street. The officials have under consideration the matter of extending the Fairview line beyond Fourth Street on Twenty-Second Avenue.

Savannah Electric & Power Company, Savannah, Ga., has started the work of repaving West Broad Street. The track improvements recently referred to in the *ELECTRIC RAILWAY JOURNAL* include heavier rail on the Thunderbolt line from Nelson's switch to the Casino, heavier rail on Forty-sixth Street and increased capacity of the Daffin Park line.

Interstate Public Service Company, Indianapolis, Ind., is working out plans for an extension of the electric transmission line from Salem to Campbellsburg, 12 miles west. A small plant is in operation in Campbellsburg at the present time, affording only fourteen-hour service, and business men are making every effort to obtain twenty-four hour service.

Marshall (Tex.) Traction Company may extend its line to serve a new industrial district established near that

city and schools. The city wants the line extended west to the Darco plant, then south around Wiley University, east to the Southside High School then north to join with the present terminus of the line on Fannin Street. The extension will make a belt around the city south of the Texas & Pacific Railway and will be more than a mile in length.

Portland Railway, Light & Power Company, Portland, Ore., will make extensive repairs to its tracks in various parts of the city during the coming summer. Definite plans have not been made but the tracks on Hawthorne Avenue will probably be reconstructed from East Water to East Twelfth Streets. In addition to its repair and reconstruction program, the railway company must participate in the costs of the improvement of Foster Road, East Twenty-eighth and Sixty-second Avenue Southeast.

Houston, Tex., John Henry Kirby of Houston, Tex., and other financiers are promoting a proposition to build an interurban line from Houston to Seabrook and other resort towns on the coast near Houston. The matter has been placed before Mayor Holcombe and the City Commissioners of Houston and application has been made for a franchise over the streets of the city of Houston. The proposed line will be about 25 miles in length and will reach all the resort places along the shores of Trinity Bay between Houston and the gulf.

Indiana Service Corporation, Fort Wayne, Ind., will co-operate with the Wabash, Ind., officials in repairing that portion of their car lines on the streets of Wabash. This includes the city car line and the interurban lines on West Market Street. General Manager Greenland was in Wabash recently to inspect with City Engineer Latchem the condition of the car lines. Mr. Greenland stated that the company would give its co-operation and send an engineer soon to make tentative plans for improvements needed.

Des Moines (Iowa) City Railway will make track extensions and improvements on two more lines this spring, according to F. C. Chambers, manager. On the Clark Street line a double track is to be put in from the point where the north line of Keosauqua Way intersects Twelfth Street, run north to School and west to Thirteenth Street. On the same line passing tracks are to be put in from Twenty-ninth Street to Thirty-second Street on Clark. This will make a total of six blocks of new track improvements on Clark. Passing tracks which now extend from Guthrie to Arthur Avenues on the East Sixth and Ninth line will be extended on two blocks further to Morton Avenue.

Springfield (Mass.) Street Railway through President Clark V. Wood reports an agreement with the Hampden County (Mass.) commissioners to pay an annual rental fee of \$10,125 for the privilege of laying its tracks across the new Connecticut River bridge. A hear-

ing has already been given by the City Council of Springfield on the company's petition for location of tracks approaching the new bridge. The company was very desirous of establishing a physical connection between its west and east side lines, so as to admit of running cars across the bridge and thence to principal urban and interurban routes, as deemed advisable, and it is said that this condition has been fulfilled. Cars, by this plan, would be looped around Court Square Extension by way of Water Street. The cost of building the approaches to the bridge is estimated by the company at \$300,000.

Recent Incorporations

Lafayette (Ind.) Street Railway has filed articles of incorporation with Ed Jackson, Secretary of State for Indiana. The concern has taken over the local lines at Lafayette after sale under foreclosure.

South Florida Traction Company, Miami, Fla., has been incorporated. The officers are G. E. Merrick, president; F. King, vice-president, and I. M. Carr, secretary-treasurer. The line will operate south of Miami as far as Coconut Grove and will include Homestead and West Palm Beach.

Professional Notes

Edwin F. Wendt, consulting engineer is now established in the practice of engineering in connection with valuation, financing, consolidation, etc. His office is in the Union Trust Building, 740 Fifteenth Street, N. W., Washington, D. C.

Waddell & Son, Inc., New York City, consulting engineers for the Connecticut State Highway Commission on the Washington Bridge over the Housatonic River, designed the special track and overhead construction on the bascule span described in the issue of April 8. The article simply says "that the bridge was built under the direction of engineers of the State of Connecticut."

Trade Notes

The Economy Electric Devices Company, Chicago, has recently received orders from the Wheeling Traction Company for fifteen watt-hour meters; from the Poughkeepsie & Wappinger Falls Railway, for twenty-one meters; the Southern New York Power & Railway Corporation for eleven meters, and from the Haagsche Tramweg Maatschappij, Holland, for twenty 1,200-volt watt-hour meters.

The United Alloy Steel Corporation, Canton, Ohio, announces that John McConnell has again affiliated himself with the company in the capacity of vice-president, in charge of operation. Mr.

McConnell gained a reputation in the early days with the United Steel Company in producing the first vanadium steel in commercial quantities made in America. His experience comprises ten years with the Carnegie Steel Company, three years with the Bethlehem Steel Company, eleven years with the United Steel Company (now the United Alloy Steel Corporation), one year with the Central Steel Company, as consulting metallurgist, and three years as vice-president, in charge of alloy steel production, with the Interstate Iron & Steel Company.

J. R. L. Glover, who has been connected with the Bridgeport Brass Company for the past six years, has been appointed sales engineer on brass and copper pipe and piping. He has firsthand knowledge of the processes involved in the making of sheet, tube, pipe and rod. He resigned his position with the Bridgeport Brass Company to enter the U. S. Air Service in France. After his return from the war he was given a position in the sales department of the company. He was soon given the title phono-electric engineer, a position which he created due to his effective promotion of the sale of phono-electric trolley wire, one of the best known products of the Bridgeport Brass Company, which is used extensively for trolley construction at points of dense traffic or severe wear. This position Mr. Glover held up to the time of his present advancement.

New Advertising Literature

The Federal Porcelain Company, Carey, Ohio, has recently issued its new Catalog No. 2, covering its line of standard electrical porcelains.

Dwight P. Robinson & Company, Inc., New York, N. Y., has begun the publication of a house organ entitled the *News*. Vol. 1, No. 1 is dated March, 1922, and gives several items relating to the work being done by this company in various parts of the world.

The Griscom-Russell Company, New York, N. Y., has just issued a new bulletin, No. 360, in reference to the application of evaporators for the purification of boiler feed water by distillation. The booklet describes the use of Reilly evaporators in the power plant for the elimination of scale, blow down, priming, etc.

The Galena Signal Oil Company, Franklin, Pa., has issued a booklet giving an alphabetical list of equipment parts for rolling stock, power plants, shops, etc., together with the particular lubricant recommended for each part. This gives in compact form the company's complete line of oils and greases for shop machinery and other railway equipment and will be of service as a convenient guide to the selection of the particular oil or grease that the experience of the company has proved the best and most economical for the purpose.

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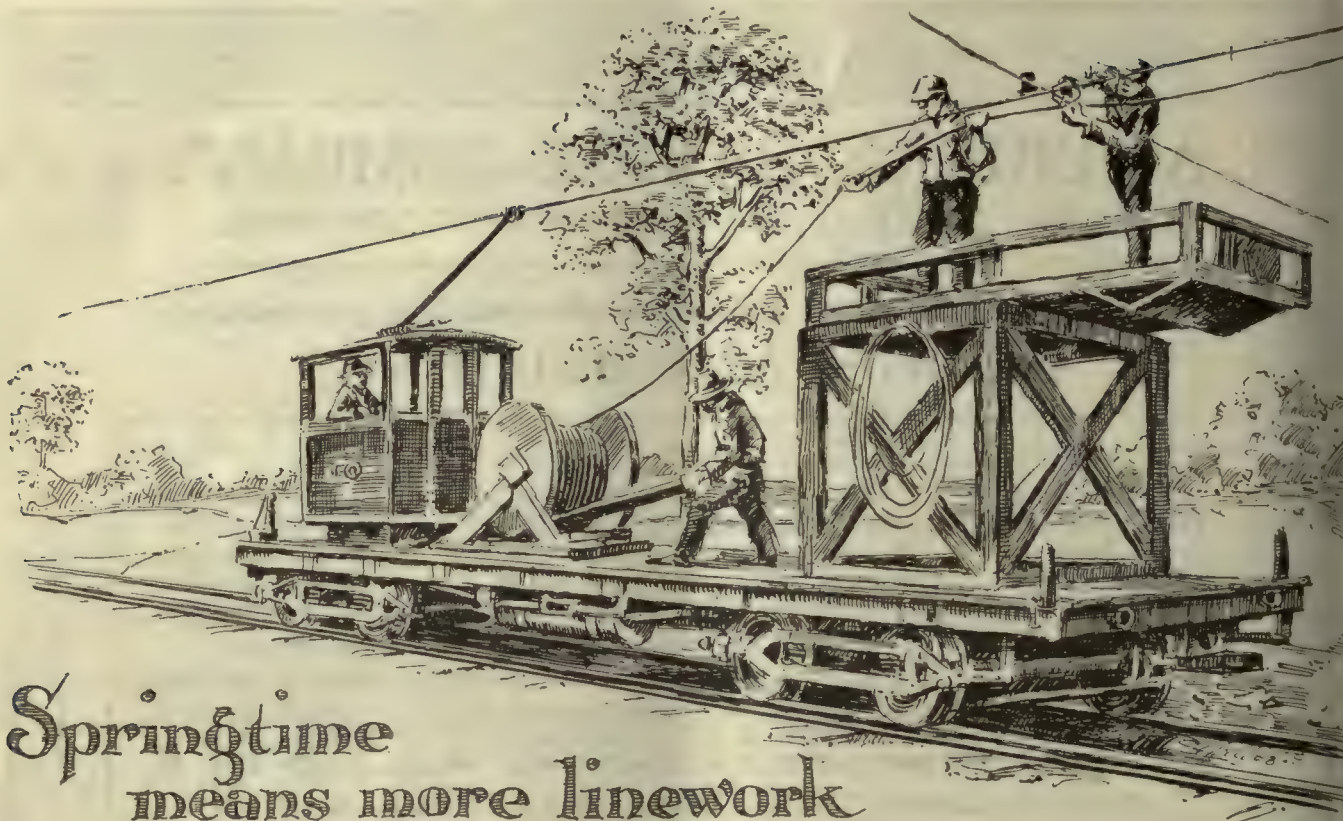
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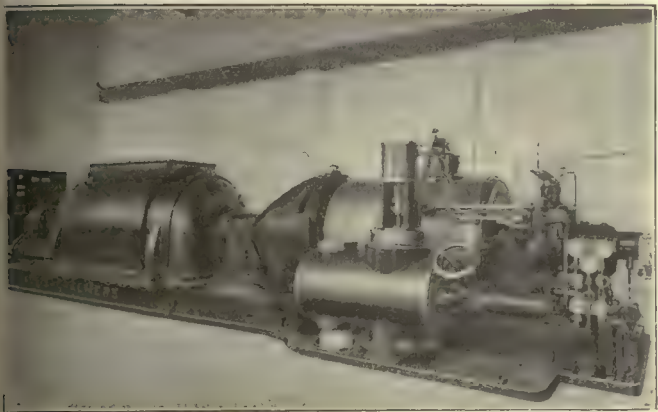
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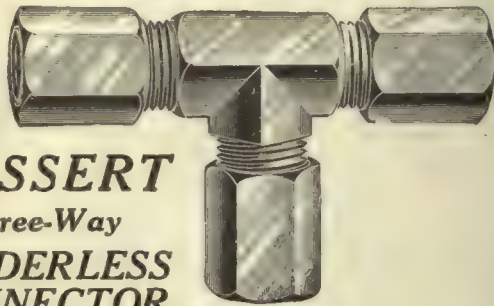
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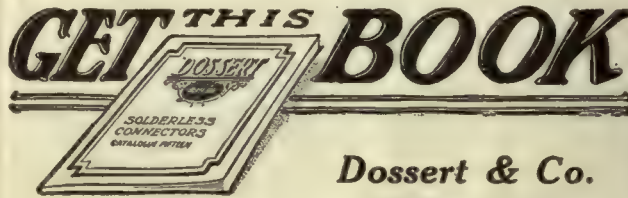


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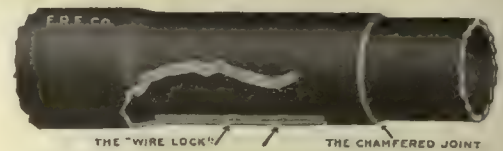
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Boston, 176 Federal; Chicago, 112 W. Adams; Cincinnati, Traction Bldg.;
New York, 233 B'way; San Francisco, 612 Howard; Seattle, 100 1st Ave. So.



U. S. Electric Contact Signals

for

Single-track block-signal protection
Double-track spacing and clearance signals
Protection at intersections with wyes
Proceed signals in street reconstruction work

United States Electric Signal Co.
West Newton, Mass.

FLOOD CITY

Rail Bonds and Trolley Line Specialties

Flood City Mfg. Co., Johnstown, Pa.



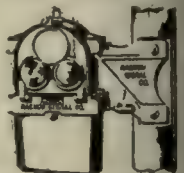
Electrical
Wires
and
Cables

JOHN A. ROEBLING'S SONS CO., Trenton, N. J.

AUTOMATIC SIGNALS

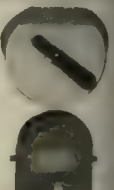
Highway Crossing Bells
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NACHOD SIGNAL COMPANY, INC.
LOUISVILLE, KY.



Chapman Automatic Signals

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Peirce Forged Steel Pins with Drawn Separable Thimbles

Your best insurance against insulator breakage

Hubbard & Company
PITTSBURGH, PA.

AETNA INSULATION LINE MATERIAL

Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches.

Albert & J. M. Anderson Mfg. Co.

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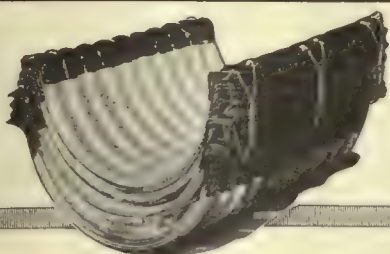
Boston, Mass.

Established 1877

Branches—New York, 135 B'way.

Philadelphia, 429 Real Estate Trust Bldg. Chicago, 105 So. Dearborn St.
London, E. C. 4, 38-39 Upper Thames St.





24 feet of
"ACME" (NESTABLE)
<TONCAN>
CORRUGATED METAL CULVERTS

A full circle corrugated culvert 24 feet long requires several men to handle it.

A 24-foot "ACME" (Nestable) Corrugated Culvert as shown above can be handled by one man. Which do you think would decrease your maintenance costs the most?

Write for Booklet M-21.



American Rail Bonds

CROWN
 UNITED STATES
 TWIN TERMINAL
 SOLDERED
 TRIPLEX

Arc Weld and Flame Weld

*Send for new
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**American Steel & Wire
 Company**
 CHICAGO
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SPECIAL TRACKWORK

Of the well-known **WHARTON** Superior Designs
 and Constructions

STEEL CASTINGS
 CONVERTER AND
 ELECTRIC

FORGINGS
 DROP, HAMMER
 AND PRESS

GAS CYLINDERS
 SEAMLESS
 STEEL

WM. WHARTON JR. & CO., Inc., Easton, Pa.
 (Subsidiary of Taylor-Wharton Iron & Steel Co., High Bridge, N. J.)

ORIGINATORS OF
MANGANESE STEEL IN TRACKWORK

Transmission Line and Special Crossing Structures, Catenary Bridges

WRITE FOR OUR NEW DESCRIPTIVE CATALOG

ARCHBOLD-BRADY CO.

Engineers and Contractors

SYRACUSE, N. Y.

ERICO CONOMICAL EFFICIENT RAIL BONDS

THE ELECTRIC RAILWAY IMPROVEMENT CO.
 CLEVELAND, OHIO

NASHVILLE TIE COMPANY

Cross Ties: White Oak, Chestnut, and Treated Ties.
 Oak Switch Ties.

Prompt shipment from our own stocks.

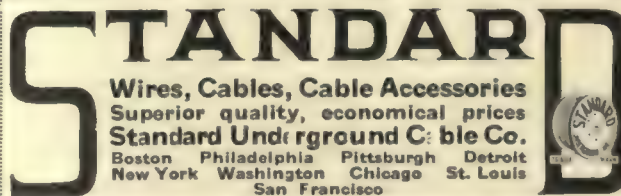
Headquarters—Nashville, Tenn.

A. D. Andrews, Terre Haute, Ind., Representative.



RAMAPO
 Automatic Return Switch Stands for Passing Sidings
 Automatic Safety Switch Stands
 Mangrove Construction - Tee Rail Special Work

RAMAPO IRON WORKS
 HILLSBURN - NEW YORK
 (Branches at Ellensburg, W.C. and Wilmington, W.D. - New York Office 70 Canal St.)



Wires, Cables, Cable Accessories
 Superior quality, economical prices
Standard Underground Cable Co.
 Boston Philadelphia Pittsburgh Detroit
 New York Washington Chicago St. Louis
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THE INDIANAPOLIS SWITCH & FROG CO., SPRINGFIELD, OHIO

Indianapolis Economy Products That Make Dollars "Grow"

Indianapolis Solid Manganese:

Frogs, Crossings, Mates and Tongue-switches. Super-quality material. Par-excellent designs. Gives many lives to one, of ordinary construction, and when worn down, CAN BE RE-STORED by INDIANAPOLIS WELDING.

Indianapolis Electric Welder:

Efficient, Rapid, ECONOMICAL, Durable. Price, \$2.00 (per day for three hundred days) thoroughly dependable every day in the year, upkeep about 75 cents per month. **LAST A LIFE TIME.**

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Fluxated heat treated Metal Electrodes, insure Uniform Dependable Welds that are from 75 per cent to 100 per cent more efficient, than the "MELT," from the same High Grade basic stock, untreated.

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Eliminate "Joints" and "Bonds" in Street Track. Higher in Strength and Conductivity than the unbroken Rail. Installed according to instructions, have proven **THOROUGHLY DEPENDABLE**, during 10 YEARS, of "Time and Usage" TEST. Extensively used in 48 STATES and COUNTRIES. Recognized as paramount **MAINTENANCE ELIMINATORS.**

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Turntables:

Ball-bearing, for ash-pits, storage yards, etc.

Indianapolis "Economy" Products

are Pre-eminently "Money Savers," YES—"Money Makers" for Electric Railways.

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

**Builders since 1868 of
Water Tube Boilers
of continuing reliability**

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CLEVELAND, Guardian Building
CHICAGO, Marquette Building
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ATLANTA, Candler Building
TUCSON, ARIZ., 21 So. Stone Avenue
FORT WORTH, TEX., Flatiron Building
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WORKS

Bayonne, N. J.
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**Makers of Steam Superheaters
since 1898 and of Chain Grate
Stokers since 1893**

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DETROIT, Ford Building
NEW ORLEANS, 521-5 Baronne Street
HOUSTON, TEXAS, Southern Pacific Building
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 705-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguilar 104
SAN JUAN, PORTO RICO, Royal Bank Building

BARBOUR-STOCKWELL CO.

205 Broadway, Cambridgeport, Mass.
Established 1858

Manufacturers of
Special Work for Street Railways

**Frogs, Crossings, Switches and Mates
Turnouts and Cross Connections
Kerwin Portable Crossovers
Balkwill Articulated Cast Manganese Crossings**

ESTIMATES PROMPTLY FURNISHED

SPECIALISTS

in the

**Design and Manufacture
of**

**Standara—Insulated—and
Compromise Rail Joints**

**The Rail Joint Company
61 Broadway, New York City**

High-Grade Track Work

SWITCHES—MATES—FROGS—CROSSINGS
COMPLETE LAYOUTS
IMPROVED ANTI-KICK BIG-HEEL SWITCHES
HARD CENTER AND MANGANESE
CONSTRUCTION

**New York Switch & Crossing Co.
Hoboken, N. J.**

BUCKEYE JACKS

high-grade R. R. Track and Car Jacks.

**The Buckeye Jack Mfg. Co.
Alliance, Ohio**

RWB DYNAMOTORS

FOR

CARBON ARC RAIL JOINT WELDING
CARBON ARC RAIL BONDING
CARBON and METALLIC ARC GENERAL WELDING
Rail Welding and Bonding Co., Cleveland, O.



W & B "Railroad Special" Wrenches

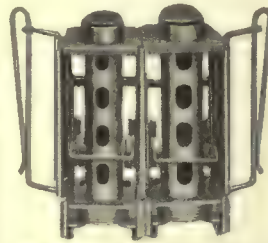
Unexcelled for Heavy Duty
Practically indestructible
7 sizes, 6 to 21 inches.

Screw Wrench Book?

J. H. WILLIAMS & CO.
"The Wrench People"

BROOKLYN BUFFALO CHICAGO
143 Richards St. 143 Vulcan St. 1143 W. 130 St.

JOHNSON Universal Changer



Adjustable

The best changer on the market. Can be adjusted by the conductor to throw out a varying number of coins, necessary to meet changes in rates of fares.

Flexible

Each barrel a separate unit, permitting the conductor to interchange the barrels, to suit his personal requirements and to facilitate the addition of extra barrels.

JOHNSON FARE BOX COMPANY
Ravenswood, Chicago, Ill.

RAILWAY MOTOR BRUSHES



Grade 402 has been proved by test the most economical and satisfactory brush for standard slotted commutator railway motors in both city and interurban service. One of a series of standard railway motor brushes.

COLUMBIA BRUSHES

COST NO MORE — LAST LONGER

NATIONAL CARBON COMPANY, INC.
CLEVELAND, OHIO SAN FRANCISCO, CAL.



Type R-10

International Registers

Made in various types and sizes to meet the requirements of service on street and city system.

Complete line of registers, counters and car fittings.

Exclusive selling agents for
HEEREN ENAMEL BADGES.

The International Register Co.

15 South Throop Street, Chicago, Illinois

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

HACKSAW GLADIUM BLADES

HIGH SPEED ECONOMY EFFICIENCY

GLADIUM CO. Inc. 34 Cliff St New York

FORD TRIBLOC

A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, $3\frac{1}{2}$ to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

FORD CHAIN BLOCK CO.
Second and Diamond Sts., Philadelphia



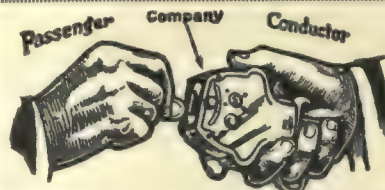
Cleveland Fare Boxes

have no bolts, nuts or screws, that can be removed from the outside. Let us tell you of other good features.

Let us explain.

The Cleveland Fare Box Co.

Cleveland, Ohio
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Preston, Ontario



Direct Automatic Registration
By the **Passengers**

Rooke Automatic Register Co.
Providence, R. I.

SPECIFY THE TERRY TURBINE

For Driving Your Auxiliaries
TERRY STEAM TURBINE CO.
Hartford, Conn.



I. T. E. Circuit Breakers

for heavy street railway work are the best obtainable. Write for New Complete Catalogue.

*They are
Uniform
in Quality!*



"LE CARBONE"
CARBON BRUSHES

LE CARBONE
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*"They Talk
for Themselves"*

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Type BT-3
Bearing Thermo-
stat Relay With
Cover in Place

Hot
Bearings
Are
Liable to
Develop
On Any
Rotating
Machine



Type BT-3
Bearing Thermo-
stat Relay With
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The Type "BT-3" Bearing Thermostat Relay serves as a watchman on constant duty ready to give warning the instant excessive bearing temperature begins to develop, and so possibly prevent a shut-down; or automatically shut down the machine before the bearing is injured and the machine wrecked.

If the continuous operation of your machinery is important and your equipment is worthy of protection, the Type "BT-3" Bearing Thermostat Relay constitutes a most reliable, effective and economical form of insurance.

BULLETIN 400-C GIVES THE DETAILS

THE AUTOMATIC RECLOSING CIRCUIT BREAKER CO.
COLUMBUS, OHIO, U. S. A.

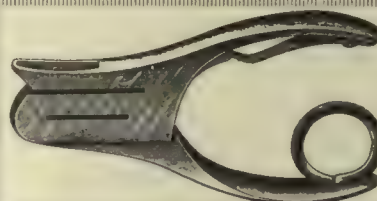
DISTRICT SALES OFFICES:
Pittsburgh—223 Oliver Bldg.
Philadelphia—1613 Chestnut St.
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MIDVALE STEEL AND ORDNANCE COMPANY
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Consolidated Steel Corporation, 25 Broadway, New York, is the sole
exporter of our commercial products.



Economical
in the
Long Run

Send for Catalog
BONNEY-VEHSLAGE
TOOL CO.
Newark, N. J.

**Car Seating, Broom and Snow Sweeper
Rattan, Mouldings, etc.**

AMERICAN RATTAN & REED MFG. CO.
Brooklyn, N. Y.

AMERICAN means QUALITY
RATTAN SUPPLIES OF EVERY DESCRIPTION

STERLING VARNISH

What Is In A Gallon?

Consider what you actually pay for in insulating varnish. What
per cent is basic material, what is benzine, spirit or other solvent?

See our page in the March 18th Issue!

The Sterling Varnish Co., Pittsburgh, Pa.

SUPER-SEASONED FIBRE

Peerless Insulation
Paper has 25 to
50 per cent higher
electrical resist-
ance.



Hornflex Insula-
tion Paper has no
grain. Folds with-
out cracking.

NATIONAL FIBRE & INSULATION CO.
Box 420 Yorklyn, Delaware.

BAKELITE-DILECTO

The fields of usefulness for Bakelite-Dilecto are many and varied because of
its superior merit over materials heretofore available in sheets, tubes or rods.
The exceptional qualities of Bakelite-Dilecto are satisfying electric railways
all over the country. Investigate.

The Continental Fibre Co., Newark, Delaware
Branch Offices:

CHICAGO, 332 S. Michigan Ave. NEW YORK, 233 Broadway
Pittsburgh Office, 301 Fifth Ave. San Francisco Office, 75 Fremont St.
Los Angeles Office, 411 S. Main St.
CANADIAN OFFICE, 89 Wellington St., W., Toronto, Ont.

—a manufacturer
in Newark, N. J.

—saved \$200

buying from an Indiana dealer in

—second-hand machinery

through his advertising in the

—searchlight section

*It pays
to read the Searchlight.*

*It pays
to advertise in the Searchlight.*



ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

ADVERTISING RATES

POSITIONS VACANT—Business Opportunities and other undisplayed ads. 8 cents a word, minimum \$2.00 an insertion.

POSITIONS WANTED—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

RATE PER INCH for ads in display space:
1 to 3 in., \$4.50 an in. 15 to 29 in., \$3.90 an in.
4 to 7 in., \$4.30 an in. 30 to 49 in., \$3.80 an in.
8 to 14 in., \$4.10 an in. 50 to 99 in., \$3.70 an in.

POSITIONS VACANT

ENGINEER of maintenance of way wanted by city property in Middle West; young graduate civil engineer with some practical experience preferred. P-412, Elec. Ry. Jour., Leader-News Bldg., Cleveland.

RAILWAY overhead line foreman wanted. Location, eastern Pennsylvania. Must be capable and able to handle entire overhead railway line work. Application will not be considered unless fully qualified. State salary and send references. P-411, Elec. Ry. Jour., Real Estate Trust Bldg., Phila.

POSITIONS WANTED

AUDITOR or assistant; 16 years' experience electric railway, light and power; references. PW-409, Elec. Railway Jour.

TWENTY years' experience all branches city and interurban railways, wish connection as master mechanic, large property, or manager small company; also had charge maintenance work, 225 motor trucks, 3 years. PW-414, Elec. Ry. Jour., Old Colony Bldg., Chicago.

MASTER MECHANIC or general foreman; 22 years' experience on all types of railway motors, also one-man cars and line work; A-1 reference. PW-407, Elec. Ry. Journal.

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Salesman Wanted

Calling on street railways to sell our products as a side line. AS-413, Elec. Ry. Jour., Leader-News Bldg., Cleveland.

FOR SALE

Two 400 H.P. Edge Moor Boilers
Complete for 175 lb. pressure equipped with Foster superheaters for 100° superheat, Diamond soot blowers and Green chain grate stokers with 102 sq.ft. of grate area. In use six years. Excellent condition. Now in service. Must be moved to make way for larger boilers. Address Room 653, Union Building, Union Traction Company of Indiana, Anderson, Ind.

Buyers
Everywhere
know

"Searchlight"

Try an ad for what you
wish to sell.

0232

ROTARY CONVERTERS

1—500 kw. Westinghouse, 3 phase, 60 cycle, 360 volts A.C.; 600 volts D.C.; 400 r.p.m., with 2—300 kw. Westinghouse 2400/350 volt transformers, also switchboard.

2—300 kw. Stanley, 3 phase, 25 cycle, 360 volts A.C.; 600 volt D.C.; speed, 500 r.p.m.; complete, with suitable transformers, also panels.

1—300 kw. Westinghouse, 3 phase, 60 cycle, 370 volts A.C.; 575 volts D.C.; 600 r.p.m.

MOTOR GENERATOR SETS

2—1000 kw. General Electric Synchronous Motor Generator Sets, each consisting of 1—1000 kw., 600-volt type MPC, 514 r.p.m., D.C. generator, and 1—1400 kva., 3 phase, 60 cycle, 2300/4000 volt, 514 r.p.m. synch. motor.

DIRECT CONNECTED ENGINE UNIT

1—850 kw. Gen. Elec. 575-volt Compound Wound 100 r.p.m. Generator, direct connected to 23 and 54 x 48 Greene Wheelock cross compound heavy duty 4-valve engine, complete with surface condensing equipment and panel; price, f.o.b. cars, \$7,500.

ARCHER & BALDWIN, Inc., 114 Liberty St., New York City

Telephone 4337-4338 Rector

FOR SALE AT A SACRIFICE

A Large Brass Band

WELTE ORCHESTRION

Replaces a Band of about 15 pieces

**THE BEST MUSIC FOR PARKS
IT IS POSSIBLE TO GET**

Cost \$6500 Can be shipped at once

For particulars address

TAYLOR, 634 W. 138th St., N. Y. C.

"Opportunity" Advertising:

Think
"SEARCHLIGHT"
First!

0099

FOR SALE

12—Brill 77-E-1

TRUCKS

with 24 in. steel wheels

TRANSIT EQUIPMENT COMPANY
501 Fifth Avenue, New York

"The House of Dependable
Service"

NEW and
RELAYING

RAILS

of all Sections

HYMAN-MICHAELS CO.

Peoples Gas Building, Chicago, Ill.

Branch Offices:

1324 Woolworth Bldg., New York
2115 Railway Exchange Bldg., St. Louis
1313 First Nat'l Bank Bldg., Pittsburgh

**Write or wire when in the market
to BUY or SELL**

Please Mention this Publication

FOR SALE

SECOND HAND CARS

trucks and motors

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Phila., Pa.

SOME ONE WANTS TO BUY

the equipment or machinery that you are not using.
This may be occupying valuable space, collecting dust,
rust and hard knocks in your shops and yards.

SELL IT BEFORE DEPRECIATION SCRAPS IT

THE SEARCHLIGHT SECTION IS HELPING OTHERS

—LET IT HELP YOU ALSO

0079

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with
Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Anchor, Guy
Electric Service Sup. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Axles
Bemis Car Truck Co.
Cambria Steel Co.
Midvale Steel & Ordnance Co.
St. Louis Car Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Standard Steel Works Co.
Westinghouse E. & M. Co.

Axle Straighteners
Columbia M. W. & M. I. Co.

Babbitt Metal
More-Jones Br. & Metal Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
Electric Service Sup. Co.
Internat'l Register Co., The

Batteries, Dry
National Carbon Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
More-Jones Br. & Metal Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller
Slide
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car-Heating Co.
Electric Service Sup. Co.
St. Louis Car Co.

Benders, Rail
Railway Track-work Co.

Boilers
Babcock & Wilcox Co.

Boiler Tubes
Cambria Steel Co.
Midvale Steel & Ordnance Co.

Bond Testers
American Steel & Wire Co.
Rail Welding & Bonding Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.

Electric Service Sup. Co.
Indianapolis Switch & Frog Co.

Ohio Brass Co.
Rail Welding & Bonding Co.

Railway Track-work Co.

Bonds, Rail
American Steel & Wire Co.

Electric Railway Improvement Co.

Electric Service Sup. Co.

General Electric Co.

Indianapolis Switch & Frog Co.

Ohio Brass Co.

Rail Welding & Bonding Co.

Westinghouse E. & M. Co.

Brackets and Cross Arms
(See also Poles, Ties, Posts, etc.)

American Bridge Co.

Bates Exp. Steel & Tr. Co.

Electric Ry. Equip. Co.

Electric Service Sup. Co.

Hubbard & Co.

Ohio Brass Co.

Brake Adjusters
National Ry. Appliance Co.

Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Br. Shoe & Fdry. Co.

Barbour-Stockwell Co.

Bemis Car Truck Co.

Brill Co., The J. G.

Columbia M. W. & M. I. Co.

St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Allis-Chalmers Mfg. Co.

Bemis Car Truck Co.

Brill Co., The J. G.

Columbia M. W. & M. I. Co.

General Electric Co.

National Ry. Appliance Co.

St. Louis Car Co.

Westinghouse Tr. Br. Co.

Bridges and Buildings
American Bridge Co.

Brooms, Track, Steel or Rattan
Amer. Rattan & Reed Mfg. Co.

Brushes, Carbon
General Electric Co.

Jeandron, W. J.

Le Carbone Co.

Morganite Brush Co., Inc.

National Carbon Co.

Westinghouse E. & M. Co.

Brushes, Graphite
National Carbon Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.

Columbia M. W. & M. I. Co.

Bunkers, Coal
American Bridge Co.

Buses, Motor
Brill Co., The J. G.

Republic Truck Sales Corp.

Bushings
Nat'l Fibre & Insulation Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.

Brill Co., The J. G.

Cables (See Wires and Cables)

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies

Car Panel Safety Switches
Consolidated Car Heating Co.

Westinghouse E. & M. Co.

Cars, Dump
Differential Steel Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.

Brill Co., The J. G.

Cambria Steel Co.

Kuhlman Car Co., G. C.

Midvale Steel & Ordnance Co.

National Ry. Appliance Co.

St. Louis Car Co.

Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Transit Equipment Co.

Cars, Self-Propelled
General Electric Co.

Castings, Brass, Composition or Copper
Anderson Mfg. Co., A. & J. M.

Columbia M. W. & M. I. Co.

More-Jones Br. & Metal Co.

Castings, Gray Iron and Steel
American Bridge Co.

American Steel Foundries

Bemis Car Truck Co.

Columbia M. W. & M. I. Co.

St. Louis Car Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.

Bemis Car Truck Co.

Columbia M. W. & M. I. Co.

St. Louis Car Co.

Catchers and Retrievers, Trolley
Electric Service Sup. Co.

Ohio Brass Co.

Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Pantasote Co.

Circuit Breakers
Automatic Reclosing Circuit Breaker Co.

Cutter Co.

General Electric Co.

Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.

Dossert & Co.

Electric Ry. Equip. Co.

Electric Service Sup. Co.

General Electric Co.

Hubbard & Co.

Ohio Brass Co.

Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.

Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coll Banding and Winding Machines
Columbia M. W. & M. I. Co.

Electric Service Sup. Co.

Coils, Armature and Field
Columbia M. W. & M. I. Co.

General Electric Co.

Westinghouse E. & M. Co.

Coils, Choke and Kicking
General Electric Co.

Westinghouse E. & M. Co.

Coin-Counting Machines
Electric Service Sup. Co.

Internat'l Register Co., The

Johnson Fare Box Co.

Commutator Slotters
Electric Service Sup. Co.

General Electric Co.

Westinghouse E. & M. Co.

Commutator Truing Devices
General Electric Co.

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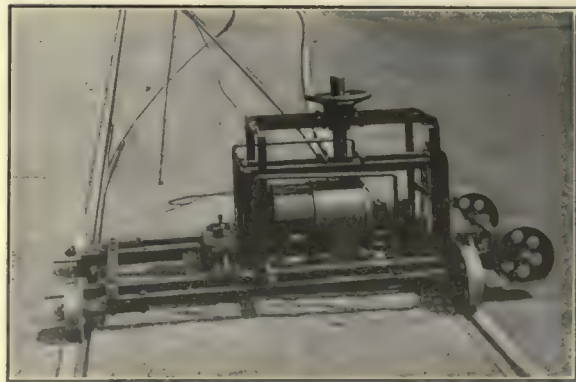
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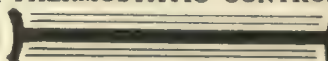
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Perey Manufacturing Co., Inc.
30 Church Street, New York City




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DAVIS STEEL WHEELS.
Standard for Electric
Railway Service
AMERICAN STEEL FOUNDRIES
1100 McCormick Building Chicago



**STUCKI
SIDE
BEARINGS**
A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

RAILWAY UTILITY COMPANY
Sole Manufacturers
"HONEYCOMB" AND "ROUND JET" VENTILATORS
for Monitor and Arch Roof Cars, and all classes of buildings;
also **ELECTRIC THERMOMETER CONTROL**
of Car Temperatures.
141-151 WEST 23D ST.
Chicago, Ill. Write for
Catalogue 1328 Broadway
New York, N. Y.

FERALUN Anti-Slip
Treads
Car Steps
Floor Plates
Station Stairs
Door Saddles, etc.
AMERICAN ABRASIVE METALS CO.
50 Church St., New York City


It's iron and emery
cast together

A CORRECTION
In the April 15 issue The J. G. Brill Co. illustrated the
Brill Vertical Handle Brake in their advertisement on
page 57. The illustration showed the brake staff ex-
tending up instead of down, as it should have appeared.
Electric Railway Journal

Any width, with or without nosing
MASON SAFETY TREAD
for car and station steps
Standard for 25 years
Stanwood Steps and Karbolith Flooring
American Mason Safety Tread Co., Lowell, Mass.
Branch offices in New York and Philadelphia
Joseph T. Byerson & Son, Chicago, Western Distributors

SEE OUR
CATALOGUE
IN
SWEETS

**THE DIFFERENTIAL
STEEL CAR CO.**
H. Fort Flowers, Pres. & Gen. Mgr.
FINDLAY, OHIO

Keep your Eye on the
SEARCHLIGHT SECTION
and your advertisements in it

612



Brill "Exhaust" Ventilator *and* Birney Safety Cars

In the development of the Birney Safety Car it was important that every part of its equipment should measure up to the high standard of service which was apparently essential for this type car.

The Brill "Exhaust" Ventilator was included, because in its many years of service it had been found to have a capacity in excess of all boards of health requirements. Its neat and symmetrical appearance and simple construction with the absence of any moving parts were important factors in its selection as the type best suited to modern city service with Birney Safety Cars.

 **THE J. G. BRILL COMPANY** 
PHILADELPHIA, PA.
AMERICAN CAR CO. — G. C. KUHLMAN CAR CO. — WASON MANFG CO.
ST. LOUIS, MO. CLEVELAND, OHIO. SPRINGFIELD, MASS.
CANADIAN BRILL COMPANY, LTD., PRESTON, ONT.

COLLIER SERVICE
sustains car card
space value by main-
taining a nation-wide organ-
ization of car advertising
experts.



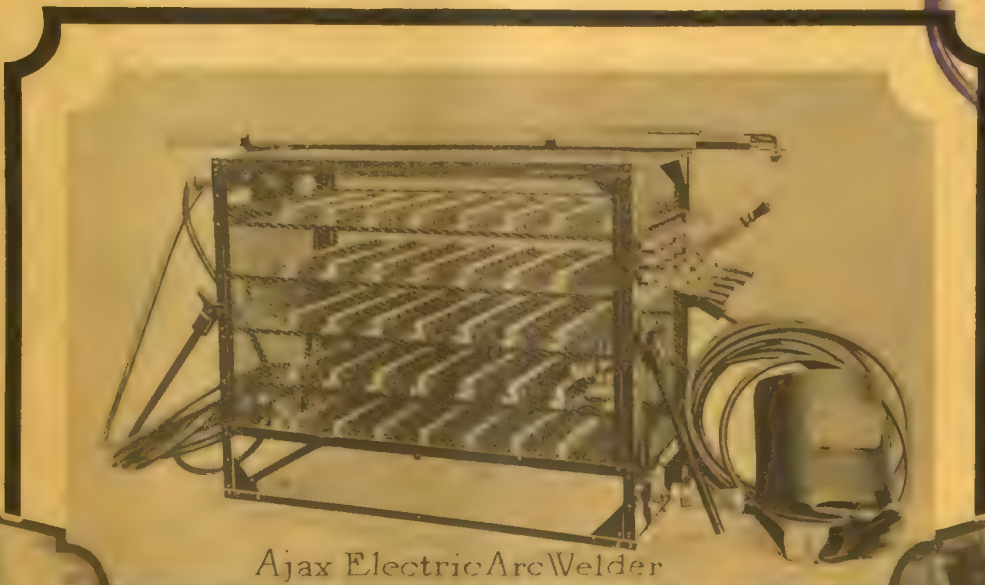
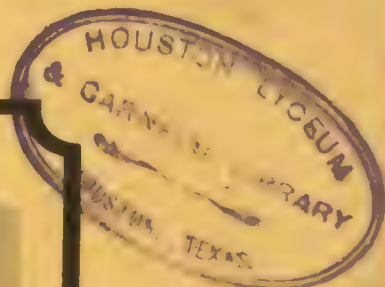
CANDLER BUILDING THE HOME OF COLLIER SERVICE



Barron G. Collier

INCORPORATED
Candler Bldg., New York

ELECTRIC RAILWAY JOURNAL



Ajax Electric Arc Welder



Reciprocating Grinder



Atlas Rail Grinder



Universal Rotary Track Grinder

A Labor-Saving Lesson

These times of stress have served one good purpose the railway companies have felt compelled to cut and almost entirely eliminate track maintenance. They have taught the value of labor saving devices for trackwork. Probably nothing else so clearly would have shown the fact that costs can be lessened by the use of labor-saving machines and tools.

This labor-saving lesson learned, it should be the plan to continue the use of such devices and to apply the idea with even greater intensity.

We offer complete outfits for efficient and economical work in track welding and grinding—proven appliances in use by 139 companies in every State and nearly every country in the world.

Write for details and present prices

Railway Track-work Company

3132-49 E. Thompson St.
Philadelphia, Pa.



Finance

"Joe," said the Vice-President, "our problems of financing this business of ours includes every phase of our activity. Your Operating Department is just as much involved as the Transportation, the Publicity, the Treasury and the Executive Departments. The physical worth and effectiveness of our rolling stock, our maintenance and our right-of-way equipment not only have a very definite influence upon our earnings, but they have a very important bearing on the public opinion of our enterprise and, therefore, on our prospects of securing local investors to buy our securities. With improving conditions of our industry, we must provide good attractive service to the public and the community. Your plan to order fifty light-weight double-truck cars for train operation during rush hours, with Westinghouse HL control, was approved unanimously by the Board yesterday."

"Fine, Boss," replied Joe; "I am glad our Board clearly appreciates the value of putting our equipment in bang-up shape. They are absolutely right about the effect this has on public good will."

"All right, Joe, go right ahead and make your plans for the future with this idea in mind."



Westinghouse

ELECTRIC RAILWAY JOURNAL

HENRY W. BLAKE and HAROLD V. BOZELL, Editors

HENRY H. NORRIS, Managing Editor

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New York, under the Act of March 3, 1879. Printed in U. S. A.

You Are Interested—

The Second-Class Postal Bill Should Pass


IN 1918 the federal government collected from the publishers in second-class postal rates \$11,712,068, and in the last fiscal year this has grown to \$25,496,719. As a result of these high postal charges, publishers have had to increase their subscription rates, and many have ceased soliciting subscriptions from sections of the country where the high postal rate would make it unprofitable. Many papers have fallen by the wayside.

The publishers believe that a reduction in second-class postal rates would greatly increase the business done by the post office department, not only in second-class mail matter, but in postal matter in other classes. Every advertisement printed in their pages leads to considerable correspondence by mail before the order is placed and often the article purchased is sent by parcel post.

The publishers are not asking Congress to put postal charges back to the rate charged before the war. They ask simply the repeal of the last two increases, or those which went into effect in 1920 and 1921. The rates would then be 175 per cent more than the pre-war rate, and the publishing industry would continue to pay the federal taxes now paid by other industries.

Is it fair that the publishing industry, of all industries, should be singled out as the sole exception and compelled to struggle along under special war taxes? The reader, the ultimate consumer, is the one who suffers most from the reduced service which the publisher is forced to give. Especially, is this increase wise when the tax is being laid upon a means for bringing other revenues to the government and to individuals and for helping industry generally?

Westinghouse Shurvent Renewable Fuses



Ferrule Type
Shurvent Renewable Fuse

**In the history of fuse protection there
are three mile stones of progress**

First: The introduction of the non-renewable cartridge enclosed fuse.

Second: The development of a renewable cartridge enclosed fuse with no scientific method of removing the hot gases from the fuse casing.

Third: The introduction of the Westinghouse "Shurvent" Renewable Cartridge Enclosed Fuse having a scientifically designed and positive path for the venting and cooling of the hot gases.

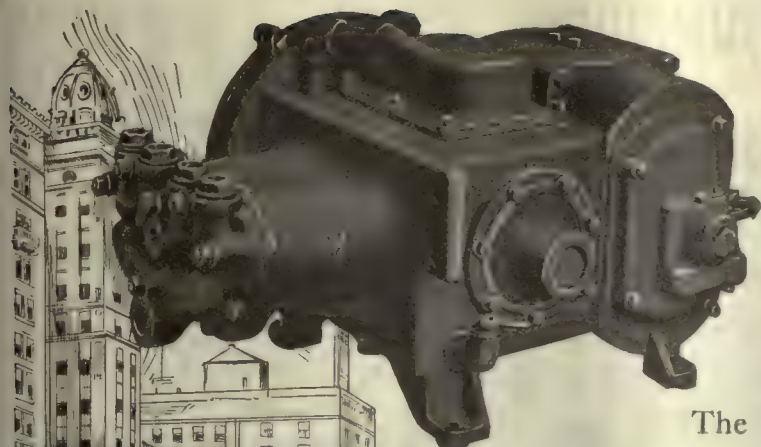
Folder 4472 describes in detail the various stages of this development.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

Knife-Blade Type
Shurvent Renewable Fuse



Westinghouse



D-2-F Compressors

The Westinghouse D-2-F Air Compressor, with 25 cu.ft. displacement, is designed for medium-weight elevated and interurban train service. This is a rugged, simplified machine which has successfully met every requirement with respect to efficiency, durability and economy. The 50 new, modern, all-steel elevated cars for Philadelphia are equipped with D-2-F's.



ELECTRO-PNEUMATIC BRAKES

The new Philadelphia cars are also equipped with Westinghouse Electro-Pneumatic brakes, which are recognized as an essential factor in the successful operation of all highly developed elevated or subway lines where short, smooth stops are imperative in the interests of train frequency and time economy.

CONSULT OUR ENGINEERS

Our engineering experts are always available for analyses of operating conditions and to render such other assistance as may be required to determine the best form of traction brake for any class of service.

Westinghouse Traction Brake Company General Offices and Works: Wilmerding, Pa.

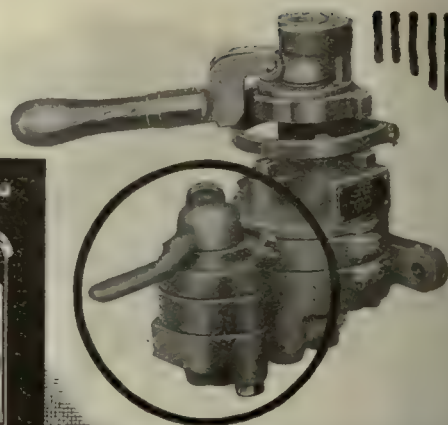
Boston, Mass.
Chicago, Ill.
Columbus, Ohio
Denver, Colo.
Houston, Tex.

OFFICES:
Los Angeles
Mexico City
St. Paul, Minn.
St. Louis, Mo.

New York
Pittsburgh
Washington
Seattle
San Francisco



WESTINGHOUSE TRACTION BRAKES



Speed Up Passenger Interchange With the new SELECTOR VALVE

THE use of double passageways on Safety Cars to facilitate passenger interchange is made thoroughly safe and practical by the new Selector Valve.

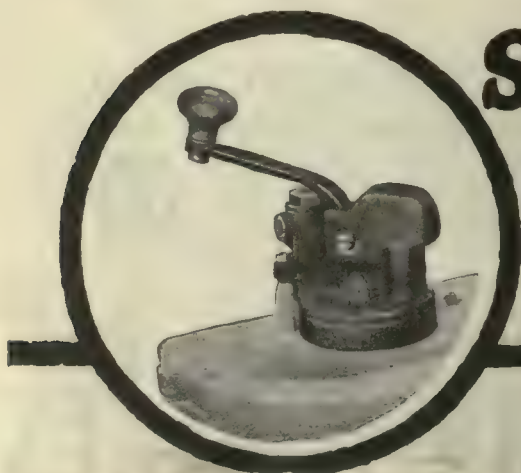
The Selector Valve, functioning in connection with the standard M-28 Safety Car brake valve, makes it a simple matter to open or close either door independently, or both together, as occasion demands.

The operator is enabled to regulate the entrance or exit of passengers to meet the

highest requirements of speed and safety under all conditions. Thus the many recognized advantages of the double passageway are utilized to the utmost with every assurance of ease and security.

The illustration gives you a picture of efficient passenger interchange as effected with the new Selector Valve.

No time lost loading and unloading passengers. Greater car mileage. Increased revenue.



SAFETY CAR DEVICES CO.

OF ST. LOUIS, MO.

Postal and Telegraphic Address:

WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH



O-B Trolley Catcher
Patented

On the instant when the wheel leaves the wire O-B Catcher stops the rope and holds it.

It is rugged. All parts are interchangeable.

What users think of O-B Trolley Catchers

All the Master Mechanics on a large system in the East gathered to discuss common problems. The question of standardizing on one particular trolley catcher came up. Out of the combined experience of its members, the meeting decided easily on O-B Catchers.

An O-B Salesman called on a Canadian property the other day and interviewed the Master Mechanic about his O-B Catchers. The railway man reported perfect satisfaction—said that he had picked the O-B Catcher after trying several other kinds.

A southwestern property is pleased with some O-B Catchers which have served without a sign of trouble for about two years so far—a great deal longer than this road had been getting from other types. May we tell you some of the reasons why the O-B Catcher is so satisfactory?

The **Ohio**  **Brass** Co.
Mansfield, Ohio, U.S.A.



New York Philadelphia Pittsburgh Charleston, W. Va. Chicago Los Angeles San Francisco Paris, France
Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators

Insurance plus Marsh & McLennan Service

Representatives

Representatives of Marsh & McLennan act as your confidential insurance advisers. They are men who have the confidence and the standing among insurance companies to plead your case, whenever they are satisfied that your rates are not a true measurement of relative fire hazard.

The service which Marsh & McLennan can render you is consistent with the service your legal advisers render. Do you place your insurance with the same care?

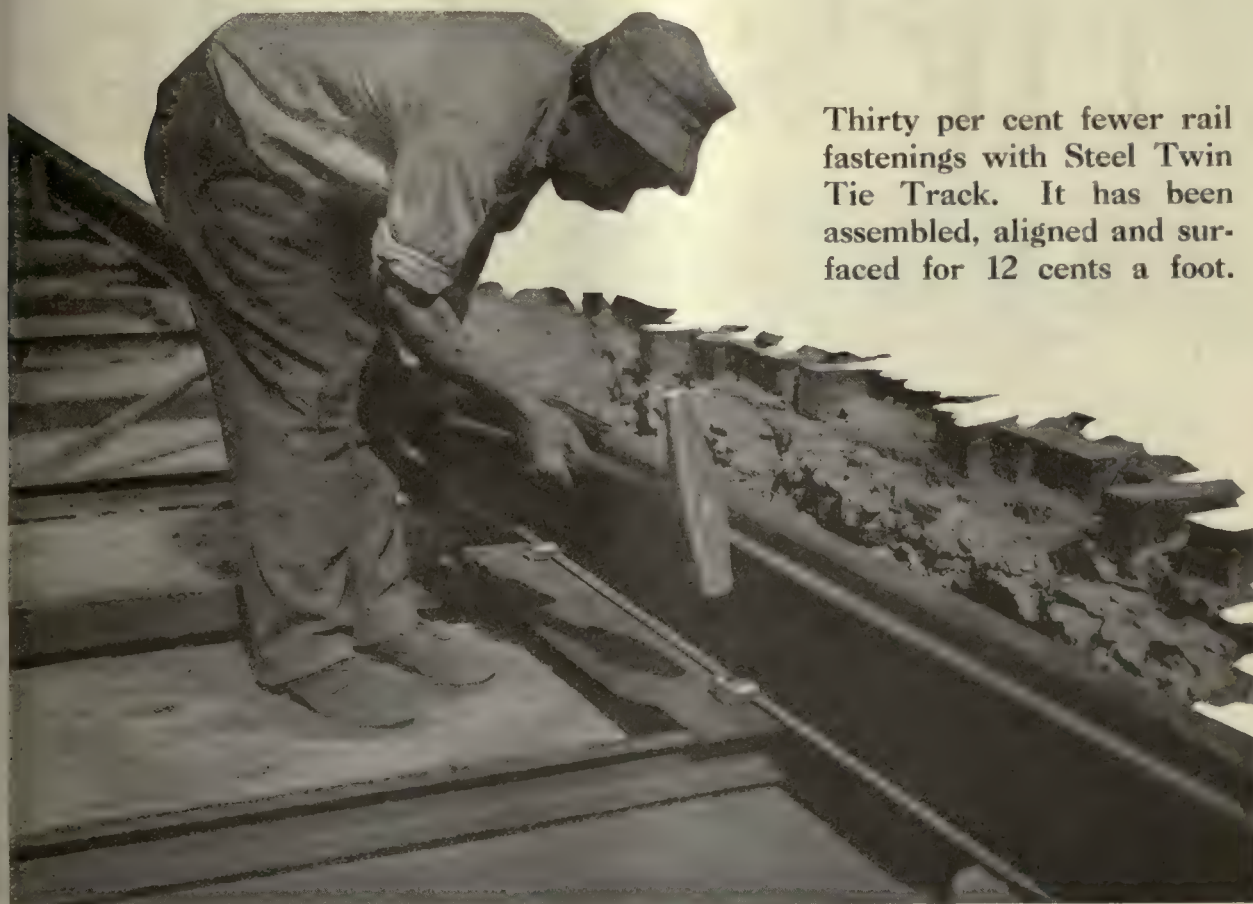
MARSH & MCLENNAN
175 W. Jackson Blvd. Chicago, Ill.

Minneapolis
New York
Detroit

Denver
Duluth
Columbus

San Francisco
Seattle
Cleveland

Winnipeg
Montreal
London



Thirty per cent fewer rail fastenings with Steel Twin Tie Track. It has been assembled, aligned and surfaced for 12 cents a foot.

Check Steel Tie construction with these essentials of good paved track—

Bearing—The efficient design of Steel Twin Ties provides 156 square inches of effective bearing per track foot at the lowest cost per unit of bearing—and, where it is most needed, 468 sq. in. of bearing under each joint.

not affected by water, temperature variations or rot.

Economy—Steel Tie Track minimizes excavation, concrete and track labor. It costs no more than wood ties in rock ballast and its longer life increases the cost per track-foot per year.

For estimating get the 1922 prices at your delivery point.

Permanent Materials

—In Steel Twin Tie construction, the tie structure embedded in concrete is

THE INTERNATIONAL STEEL TIE CO., CLEVELAND

Steel Twin Tie Track

TIE SERVICE



(Recent photograph showing creosoted pine ties supplied by this company in track, New Orleans Street Ry. since 1899)

International Creosoted Ties still in track after twenty-three years' continuous service and good for many years more.

Quick shipments from seasoned ties in stock

CREOSOTED

POLES

PILING

TIES

TIMBERS

INTERNATIONAL CREOSOTING AND CONSTRUCTION CO.

General Office: Galveston, Texas

Plants—Texarkana—Beaumont—Galveston, Texas

LIGHT

Safety Car Lighting Fixtures

Announcing a new Safety Fixture for cars where headroom is restricted

(illustrated at right.)

The flexibility of metal fingers provides for expansion and contraction of the reflector, and also cushions the glass against any severe jolt of the car. Notwithstanding this flexible grip, it is impossible for the reflector to fall or rattle in the holder.



KEYSTONE Car Specialties

Air Sanders
Air Valves
Golden Glow Headlights
Illuminated Destination Signs
Steel Gear Cases
Safety Car Lighting Fixtures
Motormen's Seats
Faraday Car Signals
Trolley Catchers
Shelby Trolley Poles
Samson Cordage
International Fare Registers
Fare Register Fittings
Cord Connectors
Rotary Gongs
Standard Trolley Harps
Standard Trolley Wheels
Automatic Door Signals
Trailer Connectors

The use of Safety Car Lighting Fixtures in your cars will eliminate broken glassware and decrease installation and lamp renewal costs. These fixtures when used in combination with proper reflectors and Mazda lamps reduce the number of lighting units required to properly illuminate the car. Thus a saving in current consumption over bare lamps is also effected. And they enhance the interior attractiveness of your cars, and your passengers are afforded greater eye comfort.

Safety fixtures fit all types of cars, being made in straight pendant form with round or square bases (illustrated); in angle base pendant form and in bracket form. Made in various sizes to use with standard 23, 36, 46, 56, 72 and 94 watt Mazda series lamps.

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA NEW YORK CHICAGO
17th and Cambria Streets 50 Church Street Monadnock Bldg.

Branch Offices: Boston, Scranton, Pittsburgh

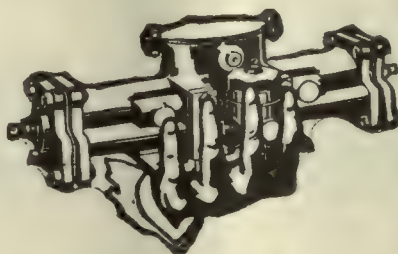
Canadian Distributors:

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver

Modernize!

!

Pneumatize!



That “flying-leap” passenger!

You can't get rid of him.

Nor do you want to!

Because his objects are truly worthy ones—namely—to save a few seconds time for himself and deliver to you an extra fare!

But—you can make your car safe for him—so safe that there will be no possibility of trapping him in doors or steps.

—and at the same time you can do this without putting any burden of watchfulness upon your conductor or in any way distracting his attention from the main issue of getting all the fares—when you equip your cars with the

National Pneumatic “Rushour” Line

Door and Step Control

Door and Step Operating Mechanisms

Motorman's Signal Lights

Safety Interlocking Door Control

Multiple Unit Door Control

In such cars, the entire control of doors and steps and go ahead signals are vested in the mere turn of a lever-handle or the pressing of a button. From the lone “flying-leaper” to the massed formation of

the rush-hour you can eliminate accidents and secure the utmost in revenue, on cars that are modernized — *pneumatized*. Think it over.

*Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.*

National Pneumatic Company, Inc.

50 Church St., New York

Edison Bldg., Chicago

Works; Rahway, N. J.



Bates Pole Lines Earn Good Will

Offset agitation for the removal of pole lines from streets
by installing Bates Expanded Steel Poles.

Demands by citizens that heavily loaded pole lines be removed from the streets are becoming more frequent. The pole lines are visible evidence of the utility company, and unsightly lines are a shining mark for the indignant citizen and his alderman.

In one large city demands for the removal of wood pole lines have been met by the installation of trim, slightly Bates Steel Poles. These Poles are set for greater spans, cost the utility less, please the citizens, and avoid in this case the expense of underground cables.

This particular utility is installing Bates Poles wherever replacement is needed from time to time—fore-stalling complaint and saving money. Many of these lines carry ornamental lighting and transmission lines as well as trolley spans and feeders. This practice of replacement pole by pole as the occasion requires will soon result in a complete steel line with all its advantages, and at less expense than if wood poles were used.

Ask us for prices on Bates Poles and data on their life and strength.

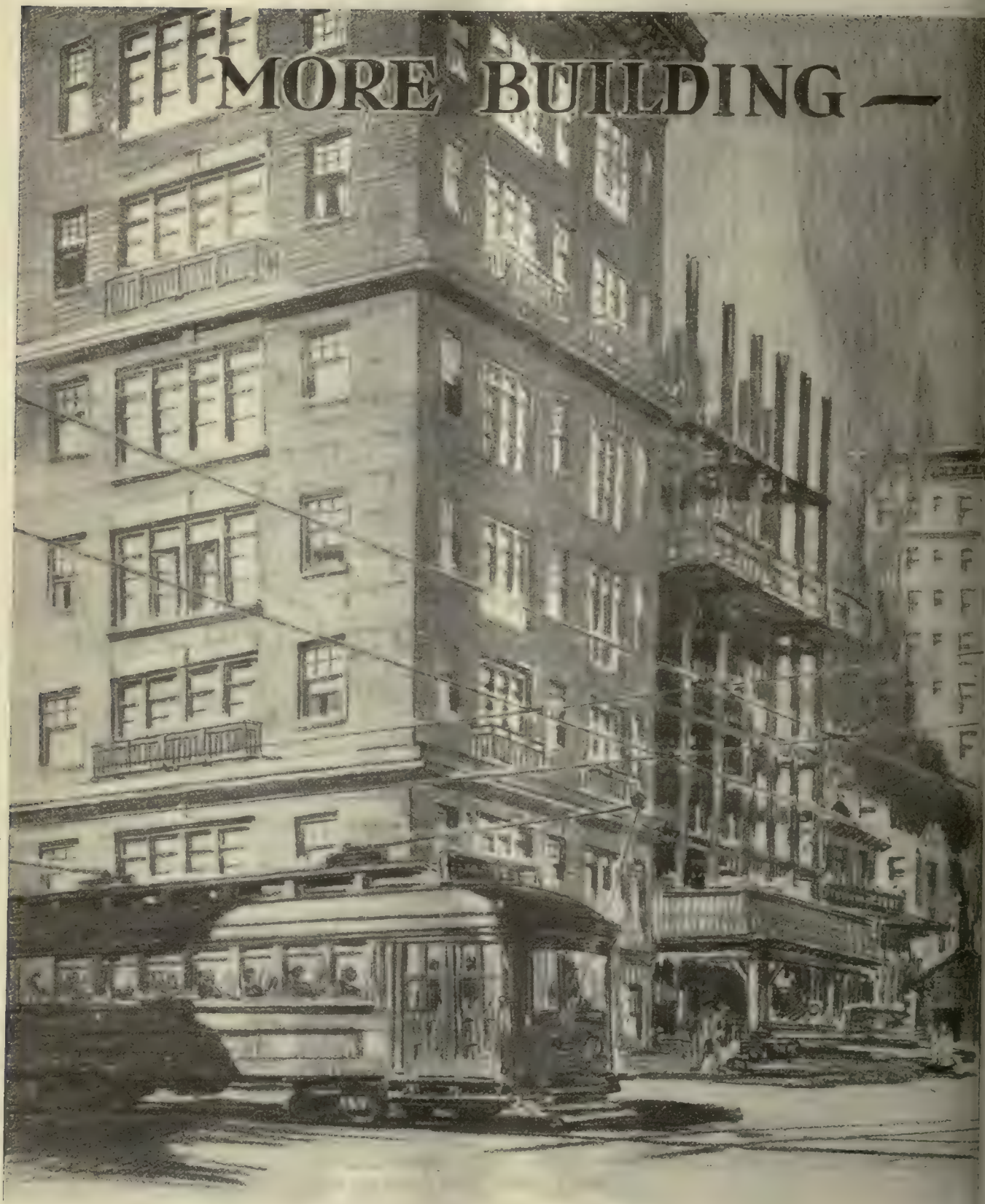
The Bates Steel Pole Treatise will be sent on request.

Bates **E**xpanded **S**teel **T**russ **C**o.

208 So. La Salle St., Chicago, Ill.

District Offices in all Principal Cities

BATES ONE PIECE EXPANDED STEEL POLES



MORE BUILDING —

AMERICAN COPPER PRODUCTS
CORPORATION
200 BROADWAY NEW YORK



MORE TRAVEL— MORE TROLLEY WIRE

"WHILE professional theorists and agitators are still arguing over the best means for starting a big building movement, builders themselves are rushing into the greatest wave of construction ever witnessed in this country.

"Projects announced and started in the metropolitan district are breaking all records for volume and cost. They are running above \$20,000,000 a week. The rest of the country is reporting a similar condition."

The above statement, made by a publication of unquestioned authority, would seem to indicate that electric railways are facing tremendous demands for service. More building means more travel and this means a logical increase of equipment on a profitable basis.

Every need for trolley wire—round or shaped—can be supplied at once from our mills at Bayway, N. J., with a specialized understanding of the problems and requirements of public service corporations, and with economy as well as speed in delivery.

If you are in the market for *a strong, tough trolley wire*, uniform in size, of known conductivity, and right as to price, we strongly urge you not to place your order without sending us an inquiry. And this applies to all your wire needs, whether they be for bare or weatherproof.



BRASS AND BRONZE PRODUCTS

Brass and Bronze Sheets Brass and Bronze Round Wire
Brass and Bronze Flat and Square Wire

COPPER PRODUCTS

Round Bare Wire Slow-burning Wire and Strand
Bare Strand Bus Bars
Trolley Wire—Round and Shaped Copper in Rolls
Flat and Square Bare Wire Rolled Rods
Tinned Wire and Strand Drawn Rods—Round, Square and
Weatherproof Wire and Strand Rectangular

AMERICAN COPPER PRODUCTS CORPORATION

200 BROADWAY NEW YORK





Riding on Oil

How many realize that in all railroad travel, either steam or electric, we are literally riding on a film of oil—a thin spread film composed of tiny globules that act as roller bearings between the sliding surfaces of metal.

The life or durability of oil film is proportionate to the vitality of the tiny globules that build it—their *quality*. And this is dependent upon their origin—the basic crudes which forms them.

Galena Oils possess not only the natural body and stamina peculiar to highest quality in basic constituents, but are still further reinforced and strengthened by Galena process in compounding. This extra strength means longer life—greater mileage. It enables them to resist the strains of weight and speed without breaking down. Their superior "body" protects and preserves the bearings. In other words, they give a lubricating service that has never been equalled by other oils.

*"Galena Quality Is Our Bond
and Your Security!"*



Galena-Signal Oil Company

New York Franklin, Pa. Chicago
and offices in principal cities



Price basis versus performance basis in the selection of lubricants

REASONS for the use of Tule as a lubricant for electric railway service embrace both the price consideration and the performance consideration.

(By price consideration we do not mean cost per pound, but cost of lubrication per car mile or per month, or some similar equitable reckoning.)

If the lubricant used enables the car or machine to develop a high degree of efficiency with least expense for power; at the same time reducing depreciation to a minimum; reducing labor and maintenance attention;—*and* if this lubricant does all this in the way of performance on a quantity one-third to one-half that formerly required, there you have both cost and performance consideration in its favor.

With Tule, this true lubrication economy is assured.

Proven records on many electric railways show that Tule not only reduces cost of lubrication directly, but that it ends repairs and shut-downs from failure of lubricant, and saves time, labor, and overhead expense.

A trial on your property will be arranged if you will write us.

"Overall Specialists"

The service men who work with you on your lubricating problems are not "experts on theories." They put on overalls and get right down to brass tacks—pack your cars—*show* you how and why Tule should be used. They get results—real money-saving results—99 times out of a hundred. The hundredth time there is no charge for the service.



The Universal Lubricating Co.

Offices: Schofield Bldg. Works: Sweeney Ave.
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—scientifically and
accurately compounded to
reduce lubricating costs

Convention Special G-E Equipped



DB-166 Contactor

GE-69-C Railway Motor

Type C Master Controller

Railway officials who attended the Mid-Winter Convention of the A. E. R. A. at Indianapolis were favorably impressed with the electric train exhibited by the Illinois Traction System.

This train, which represents some of the best developments in electric traction, is hauled by a locomotive equipped with GE-69 motors and G-E type M control.

This and other locomotives similarly equipped have been in service for many years and have operated with a minimum of electrical or mechanical failures.



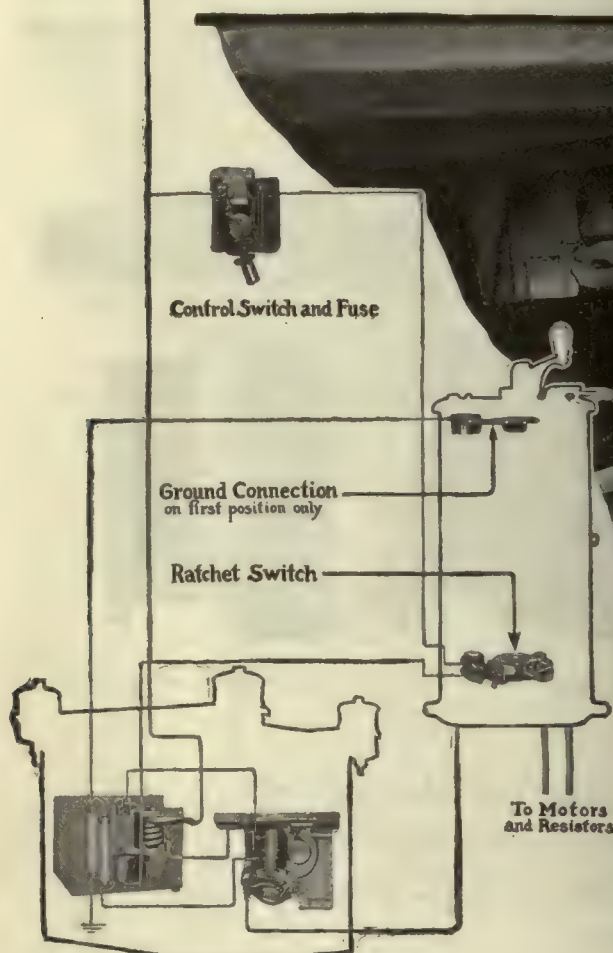
General  Electric Company

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25-144

Remote-controlled Line Breakers Protect and Save Your Equipment



Line Breaker under the Car
Consists of Overload Relay and Contactor
with powerful magnetic Blowout

Under the Car Out of the Way

When the motorman "notches up" or "shuts off", a drum controller arcs excessively. It's because the controller is opening and closing the motor circuit, although designed primarily for adjusting speeds. G-E line breakers are designed to break the heavy currents and protect the motors from improper acceleration.

On the first point of the controller, a ratchet switch closes the motor circuit through the line breaker. The least backward motion of the controller

handle opens the ratchet switch and, in turn, the line breaker contacts. Then the circuit can be closed again only by starting from the "off" position.

G-E line breaker equipment replaces the hand-operated breaker and puts the flash and noise under the car. It cuts controller maintenance costs, especially for companies with overloaded conditions.

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Consolidation of Street Railway Journal and Electric Railway Review

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Number 17

Supreme Court Decides Galveston Rate Case

THE decision of the United States Supreme Court in the Galveston case, rendered April 10, differs in a number of important respects from those in other rate cases. The city was willing to permit an 8 per cent return and the experts on both sides were agreed as to the cost of reproduction of the property on a historical basis and the amount of gross revenue and operating expenses. The main differences between the city and the company arose over various items in development cost, allowances for depreciation, maintenance and taxes, and the future trend of prices. The last-named question entered because the city maintained that prices were coming down and the company would soon be able to earn its 8 per cent, if it was not yet doing so, while the company wanted something more tangible than long-deferred hopes. In upholding the decision of the lower court, the Supreme Court declared it believed the city would probably "give full and fair consideration to a proposed change in rate if application were now made to it." If not, the court intimated that it was prepared to extend relief.

Some of the conclusions reached in its decision by the Supreme Court relating to going value are particularly interesting, especially those relating to the extent to which past losses and brokerage fees should be included in valuation. The consideration of the extent to which taxes may be deducted from income to determine what is a fair return will also attract attention.

Next Thursday Is Electric Railway Day

LAST year a number of electric railway companies celebrated May 4, the thirty-third anniversary of the completion in 1888 of the Richmond electric road, the first large electric railway in the world. At least five companies succeeded in resurrecting old horse cars, which were drawn about the streets of their respective cities to show what progress had been made in street railway transportation during the previous three decades. In three of these cases the car was driven by one of the horse-car drivers of the early days who was still connected with the company. The report of these celebrations in the issue of this paper for May 21, 1921, showed that they were witnessed by large crowds of interested people. Many of these had probably never seen a horse car before, and the comparison between this primitive conveyance and the comfortable and commodious electric car of modern type which accompanied it in several of the processions must have been impressive.

Certain other electric railway companies in the celebrations last year offered prizes for the best essays or historical reviews of the development of the local system. In one city the prize was limited to school children. Many electric railway companies referred to the anniversary in their advertisements in the daily papers.

Most of the larger newspapers carried articles and editorials about the improvements in city transportation which had been effected during the past three decades.

Occasions and events of this kind are undoubtedly helpful to electric railway companies. Too many people take things for granted. They see electric cars running through the streets, but do not realize the long and expensive experiments which led up to the use of the present style of car. Still fewer probably understand that the cost of all of these expensive changes had to be defrayed by the electric railway companies.

For this reason an object lesson of the new and the old in transit is a good thing, and where the actual cars typical of the development are shown, it is more impressive than if the idea has to be conveyed by a printed statement. "Electric Railway Day" can well be celebrated each year, not necessarily in the same way, but in some way, for the benefit of the lesson that it carries.

Cross-Trench Nuisance Can Be Controlled

THE best possible foundation for a structure such as an electric railway track is solidly packed natural soil. Time is an important factor in the compacting process, and every disturbance interferes with the solidity of the soil. An electric railway which has a franchise for a track, even if it does not own the strip on which the track is built, should therefore have something to say regarding excavations through the franchise width of street area. Only thus can proper back-filling and pavement maintenance be assured.

Just how the electric railway's rights in this direction shall be safeguarded is a problem for local solution in each case. But the fundamental principle should be recognized that once the soil under a piece of track has been disturbed the track has a very uncertain support over the disturbed area until the soil is brought back to its original condition. Unless this is done the track must bridge the gap from solid soil to solid soil, with consequent effect on track and pavement. Photographs are reproduced elsewhere in this issue to illustrate the situation which actually develops, and an explanation is given of the way in which the results of these excavations are controlled in Montreal.

In the article referred to, the author outlines in humorous fashion the operations in an attack upon the integrity of a track foundation. The story which he tells will recall to the minds of the readers many experiences of the same nature if not of the same degree. The story enforces the logic of the whole matter, showing how ridiculous it is for a community to expect a railway to keep in condition its track, and oftentimes the inclosed and adjacent paving, and for the community at the same time not to furnish protection against damage to the track foundation. Followed as it is by an account of actual success in securing such protection, the story will do more than cause a smile,

Another Term Needed in Valuation Nomenclature

LAST week mention was made in these columns of an interesting byproduct of recent hearings before the New York Transit Commission, namely, the enrichment of the electric railway vocabulary by the term "rotating standee." The same series of hearings has also disclosed the need for a further addition to the terms used in railway valuation procedure, or at least this need has become apparent through conclusions which have been drawn in public print from some of the testimony presented to the commission by members of its own staff.

It will be remembered that in the act creating the present commission it was instructed to make a valuation of the property, other than franchise or going value, necessarily used in railway service in New York City. Wisely the commission concluded as a preliminary to make estimates on several bases, of which four have been concluded. These were reported in the issue of this paper of Feb. 25, page 333.

The Valuation Bureau of the commission recommended one of these as the correct measure of present fair value and termed this one the "actual or estimated original cost less an amount necessary to restore the property to first-class operating condition." We pointed out then, however, that as defined in the accompanying report this term was a misnomer and it would probably be misinterpreted by the public to mean legitimate investment rather than what the figures actually represent. That this is so is increasingly evident. In valuation nomenclature legitimate investment has supposedly been indicated by "historical cost," a term quite generally used. Briefly, the "historical cost" is the aggregate of the sums actually and legitimately expended in producing the property, and if applied to the physical property it includes the cost of all experimental work necessarily conducted to determine the system finally to be used, the reconstruction costs to produce more modern plant, etc.

The "original cost" valuation of the New York Transit Commission does not aim to give this figure, at least for the street surface lines and for the original elevated railway line. Instead, it represents the expenditure which would be required to reproduce the property in its physical condition as of the date of inventory, but with the cost for the several classes of work and material taken not at the prices of today but at those prevalent in the year corresponding to the construction, as nearly as may be estimated.

In the way in which these figures are used they form a perfectly legitimate basis to show what they intend to convey. But they are not and cannot be the same as "historical cost" or "legitimate investment," any more than the value of any of the great inventions when perfected is represented by the worth of the material used to construct the first successful models and valued at the time the material was bought. One might as well base the present value of the real estate on Manhattan Island at the twenty-four Dutch dollars paid for it by the early settlers to the guileless red men.

In the Galveston Electric Company case, reported this week, the Supreme Court speaks of the estimated cost of reproduction on the historical basis; that is, what the property ought to have cost on the basis of prices prevailing at the time the system and its various units were constructed." This is apparently similar to what the New York Valuation Bureau ascertained; except that we know that the New York figure does not include the development costs of changing from system to sys-

tem as well as those caused by other obsolescence. The Galveston figure may; it is not clear.

Just how extensive the use of such a term would be is another question. It is not difficult to have a concept of the reproduction cost of a property at present prices, because that represents, at least theoretically, the expense of building a similar property at the present time. Nor is it hard to understand what is meant by reproduction cost at 1914 prices, because that would mean that the expense of reproduction is reduced to 1914 unit prices, which some people profess to consider "normal" at the present time. In the same way, the expression "historical cost" or "investment" conveys the definite meaning of the actual expenditure on the property.

But it is impossible to imagine either an electric railway property built today at prices of 1880 or 1890, or one built in 1880 or 1890, which would not have required some expenditures since that time for experimental development. In other words, there is no precedent, either in heaven above or in the earth beneath or in the waters under the earth, for such a manner of construction. It is neither like a property built today without experimental cost but at 1922 prices, nor is it like an old property built at the lower prices of two or three decades ago but with the burden in a new art of having been built at a time when the experience and knowledge of succeeding years were not available.

The facts here related make it clear how important it is that the nomenclature of the valuation business be cleared up—that there be a concise and descriptive expression for the basis of valuation used in New York, lest other mistakes be made in the future by contributors to journals of public opinion.

Maintenance Costs Should Be Kept on a Comparable Basis

ALL electric railway engineers are fond of making cost comparisons, and in fact they are quite necessary if the economies resulting from attention to detail in the various classes of work are to be evaluated. Compilation and comparison of costs furnish a powerful incentive toward increased efficiency, but in order for these to be of value they must include the same items. An example of a variation in practice occurs in the use of the item of carhouse maintenance. Some railways include this item in their rolling stock maintenance costs; others do not. Manifestly this leads to a variation that should be taken into consideration in making comparisons.

The problem of keeping a record of the cost and life of various wearing parts has received considerable attention from equipment engineers. A few roads have reported excellent results from the use of letters or symbols in the accountants' ledgers to designate the several parts of the equipment. The auditor is then in a position to draw off a statement of the quantity used and the cost of any particular part without great trouble. The men responsible for equipment maintenance require such records in order to conduct their work efficiently and the auditing departments are usually ready to co-operate as far as they can. By deciding on a few parts of which individual records are of advantage and then using a system so that these can be conveniently located, accurate cost records can be produced with considerably less work than by keeping individual car records in the maintenance department. If different roads follow the same practice in this particular, their cost figures can readily be compared.

Controlling Excavations Through Right-of-Way

Montreal (Quebec) Tramways Has Worked Successful Plan of Co-operation with City Under Which Railway Sanctions Digging Operations Affecting Its Track and Is Compensated for Expense Connected Therewith—Plan Has Been in Use for Nineteen Months

By R. B. GENEST

Chief Clerk Engineering Department, Montreal Tramways

IN MANY cities and towns of the United States and Canada electric railways suffer from the actions of individuals who seem to delight in wrecking their roadbed by digging holes and excavations in the right-of-way, varying in depth from 1 ft. to 30 ft., of various widths, and of shapes geometrically indescribable.

For many years the Montreal Tramways had difficulty in collecting the cost of repairs made to tracks rendered necessary by openings and cuts of all kinds and dimensions made by the city of Montreal road, sewer and water works departments, by utility companies, by contractors and by private individuals. Many such openings were made within a few hours, and often late at night. While the company's inspectors were surveying lines in one part of the city, a contractor's forces would be penetrating the right-of-way in another part, and the opening would be refilled before the inspectors could reach the location and obtain the necessary information.

Liability for payment was denied in a large percentage of cases by the parties responsible for the excavations in the first instance, and prolonged controversies arose between the city departments and contractors as to the responsibility for the damage.

TRACK SUFFERS FROM EXCAVATING BY IRRESPONSIBLE PERSONS

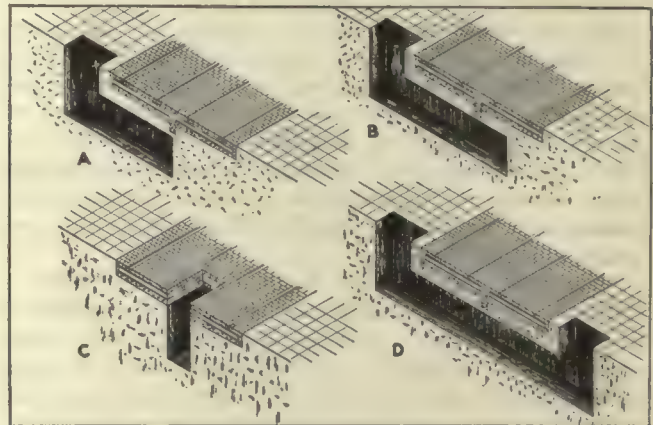
According to the city regulations, a contractor or individual, wishing to make a drain pipe connection to a sewer, applied to the city permit department for written authority to open up the pavement in the roadway. The procedure was somewhat as follows: John Doe & Company, house builders and apartment-house erectors, find that they must reach the city sewer in order properly to drain the building under construction. The sewer is located in the middle of the street, directly beneath the devil strip of the tramways' tracks. A call is sent out for expert representatives of the hole-digging fraternity, who have specialized for many years in the business of track wrecking. The services of Messrs. Hammeri & Bango are obtained. A form of contract is drawn up, in which it is stipulated that for the lump sum mentioned therein, Hammeri & Bango agree to deposit with the city of Montreal funds to cover the cost of disturbing the city paving in the vehicular roadway, and to accept all responsibility therefor. But in so far as the paving area within the boundaries of the tramways' tracks is concerned, no questions are asked.

THE JOB UNDER WAY

The excavation is started at the sidewalk curb. When the contractors reach the brow, or a point 18 in. from the outside rail, which is the boundary between the company's right-of-way and the vehicular roadway, the excavation is sloped at an angle of 45 deg. and a tunnel is commenced. A few cubic feet of concrete slab foundation is knocked off by way of testing its strength. An underground telephone line is encountered, and

unfortunately a pick point penetrates a conduit. A few feet lower down a water main appears. There seems to be a leaky joint, as the substratum is quite heavy with moisture, and a small stream of water is running down the pipe. However, that is not the affair of Hammeri & Bango.

Excavation is now down 17 ft. The sewer (so the excavators were informed) is 20 ft. below the surface. Street cars roll by overhead; an occasional motor truck bumps across the rails. The sides of the excavation show signs of a cave-in. The diggers decide to go through the surface between the rails in one track and



THE FOUR TYPES OF EXCAVATION SPECIFIED IN THE MONTREAL AGREEMENT

in the devil strip. The paving block is pried up, the sand cushion is swept aside, and the concrete ballast is hammered loose with drills and sledges. A tie rod is in the way, but this can be easily bent to one side with a hammer blow and knocked back into position by the same method, damaged a little but still there.

The concrete slab is a little more difficult, but longer and sharper drills are used and the foundation is soon removed. A little more digging and pounding with bars, and the roof of the tunnel falls in; the worst is over. The roadbed is now well broken up, and 7 ft. or 8 ft. of skeleton track is exposed to view, the rails acting as steel stringers and the ties held to the rail by the spikes. A few lengths of 2-in. plank are inserted vertically against the sides of the excavation, blocked here and there with horizontal braces and forming a rough cofferdam. The danger of a cave-in is now eliminated, and the contractors descend into the hole and remove the balance of the loose material, reach the sewer, lay their pipe and make the connection. The excavated material is then loosely back-filled, and the broken-up paving block set on the surface. The job is completed according to tradition. Messrs. Hammeri & Bango hie themselves to the offices of John Doe & Company, collect their money and are ready to tackle the next wrecking job.



TYPICAL CLASS "A" OPENINGS THROUGH RIGHT-OF-WAY IN MONTREAL

No. 1—He left the paving base, anyway. No. 2—Rails suspended in midair. No. 3—Work of demolition begins.

Next morning the telephone company experiences line trouble in the immediate vicinity in which the wreckers were busy. Diagrams indicate the presence of a conduit in exactly the same location where the drain-connecting contractors were working. The loosely back-filled material is removed, the broken conduit is discovered and repaired and a bill is forwarded to the tramways company. A few days later a digging squad from the gas company appears, to lay a sewer service for the new building and make connections to the gas main, located across the street. The same hole is used, but it is necessary to undermine the remaining track by tunneling in order to reach the main. The now well-loosened excavated material is again thrown back into the hole and the surface is lightly tamped. Both tracks and the devil strip have been broken up and undermined.

About ten days later water begins to spout up through the surface here and there, and a small lake forms. A battalion from the city water works department arrives, accompanied by foreman and sub-foreman, and bringing pumps, jacks, block and tackle and truck-loads of sundry material. A citizen who lives in the immediate vicinity regards the operations with disapproval, not knowing whether the workers are employed by the tramways company or the city. The workers seem to be making several holes right between the tracks, and they are also opening up where a hole has already been made. Why, in the name of common sense, the tramways company cannot leave well enough alone is beyond his understanding. It is not a month since the company disturbed the whole district putting down a brand new track and foundation. Inquiry discloses that the city is trying to locate a break in the water main. The break is finally located in the original excavation made by the drain-connecting experts. In

the course of a week or so the pipe is made watertight, all holes are refilled and the track is left to settle and sink unmolested.

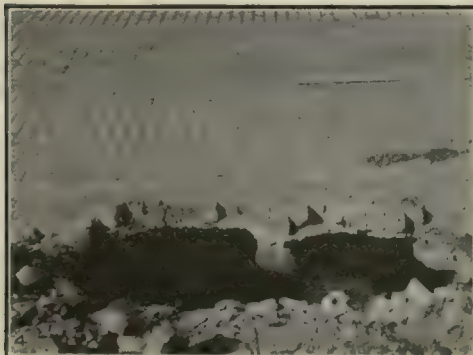
In the meantime the tramways' excavation inspector has been carefully viewing all operations, taking notes and measurements, and record of dates, names and addresses of all concerned, and further increasing the value of his information by several photographs.

MAKING GOOD THE DAMAGE

Finally the tramways' division roadmaster decides to repair the damage done to the track, as there appears to be no danger of further hole digging. A survey of the damaged roadway shows that six different excavations are located in a stretch of 60 ft. The conditions found are: Broken-up paving surface, broken and cupped joints, loose bolts and spikes, bent tie rods, sagged and twisted rail, shortened and cut-off ties, and ballast and foundations reduced to mud. A birdseye view of the track taken from the sidewalk shows a series of short vertical curves, resembling in appearance the general contour of a scenic railway.

The soggy mass now comprising the back-filled material is removed. The sides of the excavation are trimmed and the holes are filled with wet sand, packed and hard tamped. A new concrete slab is laid, joints are repaired, track is relined, concrete ballast is filled in, track is surfaced and new granite paving block is reset and grouted. The roadbed is again in operating condition.

A careful record of the cost of rehabilitating the track is made out by a construction timekeeper covering labor and material in detail. The question then arises as to whom the bills should be sent, and, if it is to be divided among the four parties concerned in the wrecking job, what proportion of the bill should



EXAMPLES OF CLASS "B" OPENINGS THROUGH RIGHT-OF-WAY

No. 4—Combination of "A" and "B" opening, concrete slab and ballast being completely knocked away on outer edge, exposing tie. No. 5—A typical case in this class. No. 6—Will this trench be properly back-filled?



SOME DEVIL-STRIP, OR CLASS "C" OPENINGS

No. 7—This one will not disturb the track. No. 8—An operation which will require careful back-filling.
No. 9—Close work in this devil strip.

each party pay? Finally the account is forwarded to the tramways' accounting office for distribution and a tremendous amount of correspondence accumulates, involving the engineering, claims, accounting and legal departments, and also the utility companies, the contractors and the city departments.

In 1920 two Belgian roadbed wreckers undertook to dig a hole in a single track, which had to be repaired by the company immediately, as the track showed signs of depression shortly after the excavation was filled in. The cost of repairs in this instance amounted to \$155. The Belgians, however, disappeared and the city authorities denied all responsibility for the bill.

CO-OPERATION REPLACES CHAOS

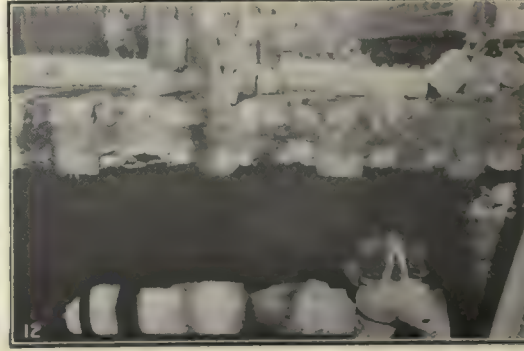
According to the operating contract between the city of Montreal and the Montreal Tramways, the company is responsible for the maintenance of the paving surface in the track area but, at the same time, the company has no right or authority to prevent any one from breaking up the paving area.

For many years the Montreal Tramways desired to bring about the institution of regulations to overcome these many difficulties. After several conferences with the city authorities and the Montreal Tramways Commission an agreement was finally drawn up. It was put into force on Sept. 13, 1920. Thus the company succeeded in obtaining some protection. The agreement is as follows:

... Before the city of Montreal will issue a permit to a corporation or contractor to make openings for the purposes of installing pipes or sewer connections, etc., in the streets on which there are car tracks, and where it is necessary to go under the car tracks to reach utilities, the city of Montreal will require the applicant to show receipt from the Montreal Tramways Company, indicating that such applicant has made a deposit to the company

covering its expense to make any repairs to the track and roadbed, made necessary on account of the operations of the corporation or contractor. The schedule of prices for doing this work and for the various types of openings shown on blueprint of our drawing No. 586 J.B. will be as follows: Type "A," \$60; Type "B," \$100; Type "C," \$100; Type "D," \$155. It being understood that after such deposit is made the Montreal Tramways Company will assume all liability for damage to its property; the applicant, corporation or contractor will, however, temporarily back-fill the opening to make it safe for the passage of the vehicular and pedestrian traffic in the streets. It is further understood that no rebate will be given to the applicant, corporation or contractor, in the event that the cost is less for repairing the damage to such excavations than as stated above, as it is understood that the prices quoted will about even up at the end of the year. The standard form of receipt will be given applicants for permits, which can be exhibited to your permit clerk, at the time of issuing city permit. The company reserves the right to increase or decrease the figures given as conditions may warrant.

This agreement has now been in force approximately one year and seven months, and, outside of a certain amount of difficulty experienced during the first six weeks or two months of its enactment, has proved satisfactory. During the preliminary stages a certain amount of tact was required in dealing with applicants for permits because they were not inclined to look with favor upon such a revolutionary change in the routine. Sporadic attempts were made to evade the regulations but, by exercise of care to detect infringement of the ordinance, the company was able to reduce the number of deposit evaders to a minimum. Instructions were issued to roadmasters, section foremen, and construction timekeepers to notify the head office immediately on discovery that an opening is being made in the company's right-of-way. This information is given to the excavation inspectors, who, between their rounds, report at stated hours to the head office and are, therefore, in constant communication with the construction



MISCELLANEOUS EXCAVATIONS KNOWN AS CLASS "D"

No. 10—This kind of work requires a large deposit. No. 11—The shoring here shows that troubles will result if careful work is not done. No. 12—This man trusts the concreting done by the railway.

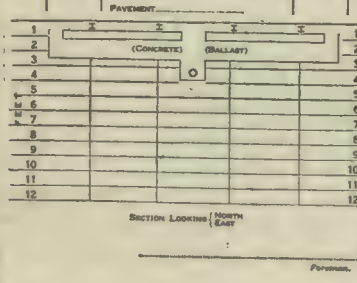
forces. Also, the local police have instructions to prevent penetration of the track area by any one unable to show a company permit.

HERE IS HOW THE AGREEMENT WORKS

Now, if a corporation or individual desires to make an excavation or opening through the right-of-way of the Montreal Tramways he applies to the city of Montreal permit department for a written authorization to open the city streets. He must explain satisfactorily the purpose of the opening. The city

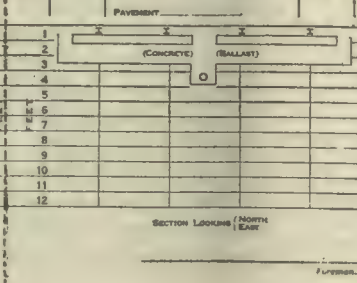
request from the engineering department (Form E-54) which is made out in duplicate, a carbon copy retained in the engineering department. The applicant then proceeds to the accounting office, where a deposit is made according to the classification mentioned in Form E-54, and he is given two copies of Form A.1. He is then in possession of the necessary authority to obtain a permit from the city of Montreal. The comptroller immediately forwards two carbon copies of Form A.1. to the engineering department, one of which is retained and attached to the file. The other is forwarded to the

MONTREAL TRAMWAYS COMPANY ENGINEERING DEPARTMENT		MONTREAL TRAMWAYS COMPANY ENGINEERING DEPARTMENT	
Report of Excavation Repaired		Report of Excavation	
No. 4711-192		No. 4711-192	
Where Repaired _____		Where Opened _____	
At or near _____		At or near _____	
Made by _____		For what purpose _____	
Foreman _____ Hrs. at _____		By whom _____	
Labor _____		Address _____	
Labor _____		Owner of Property _____	
Watching _____		Address _____	
Teaming _____		Foreman _____	
Material _____		Rec'd Notice from _____ Date _____	
		Pavement Rem'd _____ Size _____	
		Damage to Negative Cable & Bonds _____	
		Tunnel under r-of-w-Size _____	
		Excavated outside r-of-w and Bored through _____	
Negative & Bonding Repairs _____ 192		Temporary Repairs _____ 192	
Foreman _____ Hrs. at _____		Foreman _____ Hrs. at _____	
Labor _____		Labor _____	
Team _____		Team _____	
Material _____		Material _____	
Work Done _____		Work Done _____	
Remarks: _____		Remarks: _____	



PAVEMENT

SECTION LOOKING NORTH EAST



PAVEMENT

SECTION LOOKING NORTH EAST

MONTREAL TRAMWAYS COMPANY COMPTROLLER'S OFFICE	
MONTREAL,	
To The Director of Public Works, Permit Department, City Hall, Montreal.	
Dear Sir:-	
Address _____	
has deposited with this Company, \$ _____	
to reimburse us for repairs to tracks and paving to a Class _____ excavation which they propose to make under our tracks and paving for the purpose of _____ at _____	
The applicant agrees to temporarily back fill the excavation to make it safe for the passage of vehicular and pedestrian traffic in the streets.	
MONTREAL TRAMWAYS COMPANY.	
SIGNED _____	Comptroller.
Applicant.	

MONTREAL TRAMWAYS COMPANY ENGINEERING DEPARTMENT	
N° 217 A STREET OPENING PERMIT REQUEST	
To The Comptroller.	
Dear Sir: _____	
Address _____	
has made application for permission to excavate under our tracks on _____ for the purpose of _____	
This excavation comes under type _____ and you will please request a deposit of _____	
Yours truly, Dist. Engineer	

FORMS USED IN CONNECTION WITH EXCAVATION UNDER TRACK IN MONTREAL

At left—Form E-18, which tells the story of the job. Top, right—Form A-1, used in notifying city of pavement opening authorization. Bottom, right—The originating document, E-54.

departments have drawings showing all streets upon which the Montreal Tramways' lines are operated, and they also know the location of the sewers and water mains. If the applicant plans to penetrate the company's right-of-way, the city withholds the permit until the tramways, in writing, sanctions the application, which is done only when a deposit has been made under the classification indicated on a reduction of the drawing No. 586 J. B. reproduced on page 703, and according to the classification as shown in the agreement above mentioned. The applicant obtains the permit

excavation inspector, who then knows that the parties or individuals opening up the street have deposited the necessary sum of money to cover the cost of the opening to be made.

Next, the excavation inspector, having in his possession a copy each of Forms E-54 and A.1., proceeds to the location mentioned as soon as convenient and fills in Form E-18, retaining a carbon copy and forwarding the original to the engineering department head office. Copies of all three forms are then clipped together and placed in an envelope or folder bearing the number

indicated on Form E-18 and filed in rotation of numbers. All excavations or street openings are referred to by the number indicated on the inspector's reports.

In addition to other records photographs furnish irrefutable evidence in litigation in connection with the payment of a repair bill for a street opening. On the Montreal Tramways photographs are made of all openings through the right-of-way, the photographer working in co-operation with the excavation inspector. On the back of each photographic print are noted the number of the excavation appearing on the inspector's report, the date, the location, and the inspector's and photographer's signatures. These men, if called into court to give evidence, are then in a position to supply information of value.

Typical photographs are reproduced to show the different types of opening, as indicated in the captions.

SCHEDULE OF CHARGES PROVES EQUITABLE

As a check on the fairness of the amounts stipulated in the agreement, forty-five different excavation records were picked at random from the file cases and compared.



DEPRESSION OCCURRING IN PAVING SURFACE AS A RESULT OF TUNNELING UNDER ROADBED

The difference between the actual cost of repair work and the sum of money deposited by applicants was found to amount to but \$10 on the average.

In some instances it has been necessary to make exceptions from the schedule, for instance, in a case where the same opening might be used by two different city departments, or where a Class "A" opening has been extended to a Class "B" opening, or where the tramways was about to renew its track foundations. It would not then be reasonable to exact the full payment according to the agreement. The exceptions, however, have not caused any great difficulty, and, generally speaking, the operation of this agreement has been a success.

Technologic Papers of Bureau of Standards to Be Indexed

BEGINNING with No. 203, the pages of the Technologic Papers of the United States Bureau of Standards will be consecutively numbered to facilitate binding in volumes. Papers in the series will be paged consecutively until 750 pages are reached. The title page and index (issued separately) will be transmitted with the last technologic paper of each volume to subscribers who receive the complete series.

A descriptive list of all Bureau of Standards publications issued since the establishment of the bureau has been issued. This "Circular No. 24" may be had free on application to the Bureau of Standards, Department of Commerce, Washington, D. C.

New York State Railways Organized for Safety

Superimposed on a Continuous Accident-Reduction Campaign Covering Several Years, a Special Organization Made Effective This Year Is Already Producing Remarkable Results

BY A. W. KOEHLER

Director of Safety, New York State Railways, Rochester, N. Y.

BELIEVING that through organized accident prevention the burden imposed upon the company by needless accidents might be considerably lightened, the New York State Railways on Jan. 1, 1922, created an accident prevention department. The efforts of this department are being guided by a program which has been designed to embrace in its ramifications all of those features which have proved successful in the elimination of preventable accidents in industry.

The underlying conviction in this work has been that, to be successful, any movement which has for its purpose the reduction of accidents must be a co-operative one; motorist, pedestrian and trainmen must each subordinate his own immediate convenience and desire to the best interests and safety of the public. In addition to being co-operative, it must be continuous and follow some well-conceived plan as opposed to spasmodic or sporadic campaigns, characterized by hysterical display or propaganda of doubtful value.

Although in operation only a few months, the preventive measures employed by the State Railways already give promise of satisfactory results. Accidents from all recorded sources show a perceptible decrease. It may be fair to assume that this decrease is not due entirely to a favorable combination of events, but has resulted at least in a measure from methods adopted toward that end.

The creation of an accident prevention department by this company does not mark its entry into a new field. R. E. McDougall, formerly claim agent of the company and now general manager of the New York & Harlem Traction Lines, New York City, while in Rochester devoted a considerable portion of his time to safety. He stimulated an interest in accident prevention on the part of employees of the company through friendly competition. A silver loving cup offered to the station having fewest accidents during a given period was spiritedly contested for, and its possession was a matter of pride to the winner.

The results that attended these earlier efforts and the growing conviction on the part of officials of the company that accident prevention might further benefit the company and the community led to the formation of this new department which is devoting its entire energy to the work of safety.

FIGURES SHOWING REDUCTIONS IN ACCIDENTS OF VARIOUS KINDS

A comparison of accident records for the month of February with those of January of this year, as well as with February of last year, shows a reduction that is not confined to any one class of accidents but is evident in every recorded classification. The reduction over February, 1921, is 11.3 per cent, and over January of this year is 24 per cent. Comparing the records of January and February of this year, we have the following classifications and their corresponding reductions: Collisions with motor vehicles, 28 per cent; collisions

other than motor, 20 per cent; collisions with pedestrians, 62½ per cent; collisions with cars, 7.69 per cent; derailments, 35.48 per cent; employees injured, 57.14 per cent; alighting from cars, 7.14 per cent; boarding cars, 27.87 per cent; injured on cars, 8.51 per cent; damage to company's property, 22.76 per cent; miscellaneous, 13.33 per cent.

These results have been secured because eight to nine hundred men are alert and keenly observant of conditions or practices that make for accidents. Each day's reports bring to the accident prevention department a fund of information that makes it possible to deal intelligently with the accident situation.

THE TRAINMEN'S TRAFFIC REPORT

Records of violations of traffic ordinances on the part of motorists are most numerous. Of these the most

New York State Railways Safety Department Trainmen's Traffic Report	
Date <i>March 28-22</i>	Hour <i>10 A. M.</i>
Place <i>Main and State Sts.</i>	
General Description and Remarks <i>Cars passed standing car, from which persons were alighting, at high rate of speed. Nearly struck woman.</i>	
License No. (if vehicle) <i>307-707</i>	
Reported by <i>Chas P Smith</i>	
Motorman No. <i>1356</i>	
Conductor No. <i>1335</i>	
Line <i>Central Park and Jeffers on</i>	
Car No. <i>457</i>	
Car Going <i>Outbound</i>	
Use Other Side for Additional Information	

A SIMPLE FORM OF REPORT WHICH IS ACCOMPLISHING MUCH IN ROCHESTER

frequent is the passing of a standing street car while the latter is taking on or discharging passengers. Since the advent of the "trainmen's traffic report," a sample of which is reproduced, violations of this sort have shown a marked decrease. "Stunts" by boys, such as stealing rides, hanging onto the sides of cars while riding bicycles, riding on the fender and similar dangerous practices, have also been reported and steps have been taken to discourage such acts of recklessness. In this work the schools are

co-operating to a commendable degree. Motormen and conductors, inspectors, division superintendents and all of the various departments are co-operating to achieve the greatest possible reduction of accidents.

Safety committees have been appointed and are functioning in excellent fashion.

Points of contact are being established with all of the various agencies which might be instrumental in contributing to the success of the efforts as a whole. Of these, favorable mention is due the police department, whose active co-operation is a large factor in eliminating the hazard created by the reckless motorist, who passes at a greater speed than is compatible with safety a car which has stopped to discharge and take on passengers, or who otherwise endangers the lives of street car patrons.

The medium through which the information concerning the violation just mentioned is conveyed to the police is the trainmen's traffic report, already mentioned. Motormen and conductors are supplied with blank forms for these reports and on them notify the accident prevention department of any hazardous conditions or practices observed by them while operating cars over their different routes.

Another feature, the efficacy of which is making itself

manifest, is that of writing a letter to some responsible person in a firm whose truck or wagon driver has violated a traffic ordinance. This letter advises the owner of the particular offense of which his driver has been guilty, the possible consequences are called to his mind and his co-operation to prevent a recurrence is sought. In every instance the reply to such a letter has brought assurance of the desire of the recipient to co-operate with us and his thanks for apprising him of dangerous practices indulged in by his drivers. Information regarding such practices is conveyed to the accident prevention department, also through the medium of the trainmen's traffic report.

Safety messages to the car riding public will be carried each week on cards in the car. These cards will bear the heading "Trolley Flashes" and will convey a different message each week. In addition, from thirty to forty thousand employees of industry will be reached through safety talks at their respective plants and articles published in the house organs of their employers.

The schools too are co-operating actively by providing opportunity for safety talks to the pupils. These talks emphasize the ways in which school children can do their parts in assisting in our accident prevention measures.

From time to time the newspapers will be given articles dealing with the progress of our efforts, so that the subject will be kept constantly before the public.

Through these sources, and such other avenues of approach as may be opened to us, "Safety" will be brought to every man, woman and child in the community, and thus, in due time, marked reductions in accidents are inevitable.

Large Layout of Chrome Nickel Steel Special Trackwork

THE Milwaukee (Wis.) Electric Railway & Light Company is installing its first general layout of special trackwork made of chrome nickel steel, having originated the idea of the use of this metal in connection with steam road crossings in 1920. The full particulars about this type of special trackwork were published in ELECTRIC RAILWAY JOURNAL, Vol. 55, page 799.



NICKEL CHROME STEEL LAYOUT GOING IN AT EAST WATER AND MICHIGAN STREETS, MILWAUKEE

The Philadelphia Rapid Transit Company and one or two other street railway companies have since installed a number of chrome nickel steel layouts. Most of these and the one pictured herewith were manufactured by the Lorain Steel Company.

Notes from Southern Cities

Railways in South Active in Improving Properties Along Modern Lines—Chief Handicaps Are Jitney Competition and the Present Industrial Situation, Brought About Because of the Low Prices Being Obtained for the Principal Agricultural Products of the South

THE Birmingham Railway, Light & Power Company has been in the hands of a receiver since Jan. 23, 1919, but the property has been well maintained under the receiver and considerable reconstruction of cars and tracks has been done. With the revival of the steel industry, on which the city of Birmingham and neighboring communities largely depend for their prosperity, the benefits of this rehabilitation will become apparent. The Birmingham Railway, Light & Power Company is one of the group of American Cities Company properties now being reorganized. It has 154 miles of track and several long interurban extensions.

Birmingham is a city of recent growth, so that the main streets are wide and there is not the same street congestion as in many other cities in the South. From the railway point of view the wide streets have the advantage that they provide ample parking space for automobiles, and the competition from this source is considerable. Since 1915 there has also been some jitney competition, due largely, it is probable, to the employment situation in the steel industry. The jitneys number about fifty or sixty and charge various fares ranging from 10 cents to 7 cents, against 8 cents for the trolley; but they do some business, because of their higher speed.

One step being taken by the company to meet this competition of jitney and private automobile is to provide more units by reducing the number of trailers and by operating more motor cars. By this means also the average speed is increased. A number of one-man cars have also been put in service. One hundred per cent one-man operation is not contemplated, but the company believes that it can use still more one-man cars to advantage.

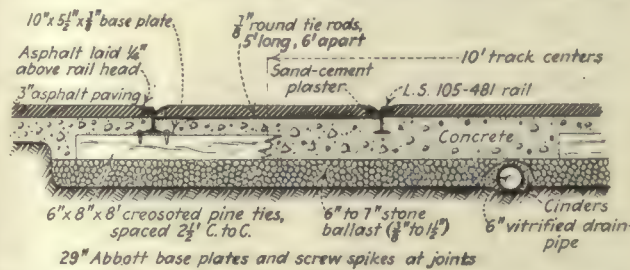
Only one bus line has been started in Birmingham. This was promoted by the owners of a real estate development in the northern part of the city and was continued for about six years. It proved a losing venture, and an arrangement has been made within the last year between the land company and the trolley company by which the latter agreed to extend its tracks into the development and supply the necessary service. The buses were then withdrawn.

As with a few other companies, transfers are punched with the point of origin rather than the line to which the passenger wishes to transfer. The principal advantage claimed for this plan is that it saves the time of both conductor and passenger and avoids any dispute owing to misunderstanding between the two. The company is protected against looping by a provision printed on the back of the transfer that a passenger is not permitted to return on the transfer to a point near that from which he started.

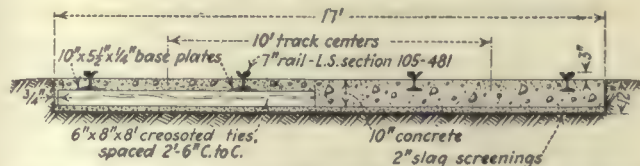
A campaign directed against accident reduction was begun last year through an offer to the employees to divide among them 50 per cent of all the saving in the accident account over the average of the three previous years. Under this plan, during January, 1922, each

man got \$4.07. Shop men share in the division as well as trainmen, as they are held to have as much to do with the safety record as the trainmen. The latter are warned that the claim department requires complete reports of all accidents to assist in keeping down the cost of accidents. The result of this policy has been shown in the quality of the reports rendered of all accidents.

In new track and in track reconstruction in paved streets the company is using a 7-in. 105-lb. girder rail,



STANDARD GIRDER TRACK CONSTRUCTION ON PAVED STREET IN MEMPHIS



SPECIAL SHALLOW CONSTRUCTION IN MEMPHIS USED ON VIADUCT

or a 7-in. 101-lb. T-rail. Under special work the practice is to employ an 8-in. x 10-in. oak tie, but elsewhere to use creosoted pine ties. With a 7-in. T-rail a six-bolt 34-in. angle plate is used, welded top and bottom except at the extreme ends. Some work has been done during the past year in taking out left-handed turns in the downtown streets. Owing to the practice of the company to collect fares pay-enter inbound and pay-leave outbound loop operation in distinction from through operation is favored.

MEMPHIS

The Memphis Street Railway has constructed about 4.2 miles of track during the past year. Creosoted pine ties have been used in all new work. Although these cost \$1.10 each at present as compared with 70 cents for untreated oak ties, the additional life of the creosoted ties is considered to warrant this additional expense. The Lowry process or creosoting is used. In some old track, which had been down thirty years and was recently taken up, certain of the creosoted ties were found in such good condition that they were used over again.

The standard track construction in Memphis in paved streets is shown in the accompanying section. The tie rests on 6 and 7 in. of stone ballast with concrete around the ties and under the rail. The joint is made with an eight-hole joint plate and an Abbott base plate. The former is electrically welded to the rail and the latter is screw-spiked to the tie and also electrically welded

"Chats with the Consolidated"

"The Effect of Automobiles on Street Car Travel"

Has it ever occurred to you that automobiles have contributed largely to the position in which the street railway at present finds itself? Well, it is a fact that they have. Not only have we lost the fares formerly paid by the auto owners and members of their families, but thousands of fares are lost through auto owners "picking up" friends going to and from work in the mornings and afternoons.

How often have you stood on a street corner waiting for a street car, perhaps with several other folks, when just before the street car arrived an auto drove up and the would-be street car riders were invited to ride "as far as I go?" Each passenger thus lost reduces our revenue, and has a direct bearing upon the service we render.

We appeal to the auto owners to assist us in rendering a more satisfactory service to the people of Charleston by discontinuing this practice and thereby direct these fares into the proper channel. A prosperous street railway rendering an essential service is of greater value to the community than are the few cents to the individuals who are occasionally "picked up." Please allow those who would patronize the street cars.

Your Co-operation Is Requested and Will Be Appreciated

CHARLESTON CONSOLIDATED RAILWAY
& LIGHTING COMPANY

Principal business street, for example, is only about 35 ft. wide from curb to curb. The company is doing what it can to relieve this situation by speeding up cars, cutting out unnecessary stops and in other ways. The headway on most lines is ten minutes in winter and a shorter time in summer.

In Charleston the railway, electric lighting and gas services are all owned by the same company, and publicity is conducted through a regular department serving all three departments. Newspaper space and car folders are used.

A feature of the newspaper space is a series of friendly talks, called "Chats," carried in each of the three papers in Charleston on Tuesday, Thursday and Saturday. This series was begun July, 1921, and the space taken is usually one column wide and 8 in. deep, but this space is varied. Typical "Chats" on the railway system are reproduced on this page. Three prizes, all in car tickets, of \$50, \$30 and \$20 were offered for the first, second and third prizes on May 4, 1921, "Electric Railway Day," for an essay on the advantages of electric railway cars as applied to Charle-

ton. The paper which received first prize was a well prepared article which gives in detail the advantages to real estate owners, to school children, for social and recreational purposes, etc.

The car folder is entitled "Tri-Service," and the pages of a few recent issues are reproduced. Three departments are carried, named respectively "Smile-a-While," "Safety First" and "Happenings in Cardom."

CHARLESTON-ISLE OF PALMS

The Charleston-Isle of Palms Traction Company's line is right across the bay from Charleston, with which it has connection by ferry owned by the company. The principal business is in summer, when all of the forty-two cars of the property are operated.

The usual method of operation is to send out a motor car with trailer followed by a motor car, as the line does not have loops at its terminals. On the arrival of the two-car train at the end of the line, the following motor car couples up to the trailer, which is uncoupled from the first motor car.

This line has the distinction of having raised fares during the last five years from 30 cents to \$1.30 for the round trip.

Getting a British Franchise

THE procedure of getting authority to build a street railway of any kind in Great Britain is quite complicated. Many of the British tramway properties are municipal, but even a city cannot build a trolley line within its boundaries without getting a special bill through Parliament authorizing it to do so. If the undertaking is a private one, Parliament will not even consider the application unless the local authority, town or county council, approves. In London a somewhat different condition prevails. There the County Council is the tramway authority, but the local borough councils in London are the road authorities, and in most cases they possess power of veto and often exercise it.

Buses are on a different basis. If the local authorities wish to go into the bus business, they must get Parliamentary powers in which the routes are specified. If a private company wants to start a service, all it needs is to get the consent of the local authorities and licenses for the buses. If the proposed bus routes are likely to compete with the municipal tramway routes, the licenses probably will be refused. For interurban service where no such competition question arises, licenses apparently are secured for the asking. In London here also the condition is different. Neither the London County Council nor the metropolitan borough councils seem to have any say about buses. They are licensed by the Metropolitan police authorities, and their routes are regulated by them and by the Ministry of Transport.

One great reason for the great development of buses in London is that tramways are excluded from a considerable part of its area, including the downtown business and financial section known as "The City," and also from the fashionable West End.

After experimenting with double helical gears for the 2,500-hp. electric locomotives for the Gothard section, the Swiss Federal Railways has adopted the Maag spur gearing with case-hardened and ground pinion teeth. The wheel teeth are of unhardened steel. For the State Railways the pinion will be made of case-hardened chrome-steel and the wheel rim of forged steel.

"Chats with the Consolidated"

BACK TO NORMALCY—

Use Your Street Cars More

Saving is at the bottom of it. Our savings must repair the waste of war in addition to performing the usual job of developing our resources.

The man who rides the street car instead of using more expensive transportation is to be congratulated. He is helping the country by adding to the heaps and savings that will bring us back to normalcy.

He is helping himself by increasing his stake in the country through saving. He is helping the community to maintain a service that is vital to it.

The service he buys when he rides a street car is second to none in the country. The price he pays is reasonable. We repeat—he is to be congratulated.

"Patronize Your Street Cars"

CHARLESTON CONSOLIDATED RAILWAY
& LIGHTING COMPANY

Electric Railway Bridge Built in Eleven Hours

Holyoke Street Railway Faced the Problem of Providing a Temporary Canal Crossing Instantly or Discontinuing Important Service for an Indefinite Period

EARLY in December, 1921, the engineering department of the Holyoke (Mass.) Street Railway, under the direction of George E. Pellissier, assistant general manager, did a remarkably quick piece of temporary bridge construction under circumstances which made this work especially difficult.

This emergency job was necessary on account of a misunderstanding as to temporary diversion of electric railway traffic during the construction of the new

ing, it was necessary to let the water back into the canal beginning soon after midnight. A total of but fifteen hours was available from the time the first work could be done until the job was completed and all materials, tools, etc., had been removed by the company from the canal bed.

The importance of this railway connection can be appreciated from the fact that about 300 cars cross the trestle each day and the entire community of South



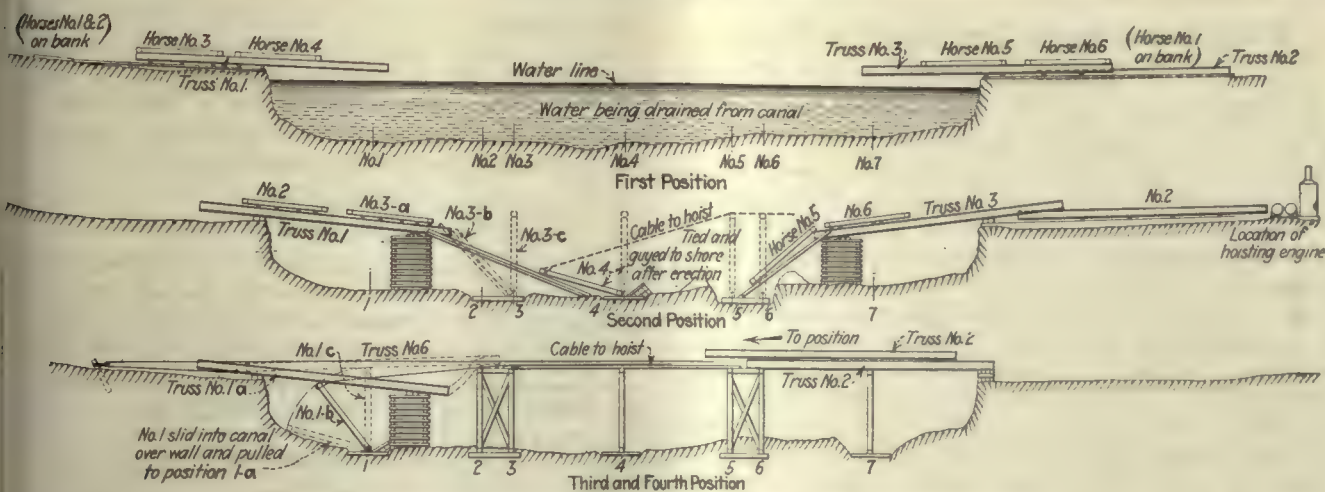
BUILDING A BRIDGE IN ELEVEN HOURS AT HOLYOKE, MASS.

"Valley Bridge" over the second level canal in Holyoke. The railway company was not informed that no provision for this had been made until it was almost too late to draw down the water in the canal to permit the erection of cribwork in its muddy bottom to support horses or bents for a trestle. However, with only five days available to secure the material necessary for the trestle, to fabricate it and to deliver it at the bridge site, and only one day available to erect the structure, the railway undertook the work. In explanation of the shortness of these periods, it should be said that on account of the ice it is impossible to draw the water out of the canals during the winter, and in the present case the water had been drawn out of this canal, presumably for the last time, two weeks prior to the day when the bridge was scheduled to be put in, namely, Sunday, Dec. 11. Fortunately weather conditions early in December were favorable, and it was possible, through the courtesy of the Holyoke Water Power Company, to draw the water out of the canal once more. It required until 11 a.m. Sunday to do this, however, and as the paper mills which draw water from this canal all had to resume operations early Monday morn-

Hadley and Amherst would have been cut off from trolley connection with Holyoke unless the temporary bridge had been built.

The technical details of the construction are more or less standard and can be comprehended from the drawing reproduced. Soundings made before the water was drawn out showed that the canal bottom was soft ooze. Provision was made, therefore, for building cribwork on the bottom and timbers were framed to make up seven supporting horses. The horses were framed near by and slid into place by means of rollers and a donkey engine. The steel I-beams were lifted into place by means of the rigging shown in the accompanying drawing, in the following manner:

These horses were framed on the banks of the canal while the steel beams were being assembled and bolted together in three sections, each 50 ft. long. On two sections of steel work, one on either side of the canal, two complete horses were placed and the steel sections with their horses were mounted on rollers on the banks of the canal. While the water was being drawn out of the canal these steel sections were hauled out over the canal by means of a donkey engine (the only power



STEPS IN PROGRESS OF ERECTING BRIDGE WITH LITTLE MACHINERY AT HOLYOKE

equipment available for the job) until the sections were practically balanced on the edge of the wall.

As soon as the water was out of the canal a crib was made of ties on the bed of the canal under the ends of the projecting steel beams just high enough so that when the steel beams were tipped down they would strike a roll on top of the crib and slide right into place with one end of the beam resting on the bed of the canal. The two horses on these beams were thus deposited practically in their proper position and, being on an incline, very little effort was necessary to pull them into upright position and bolt them together to form the double horses or piers which are shown in the accompanying elevations.

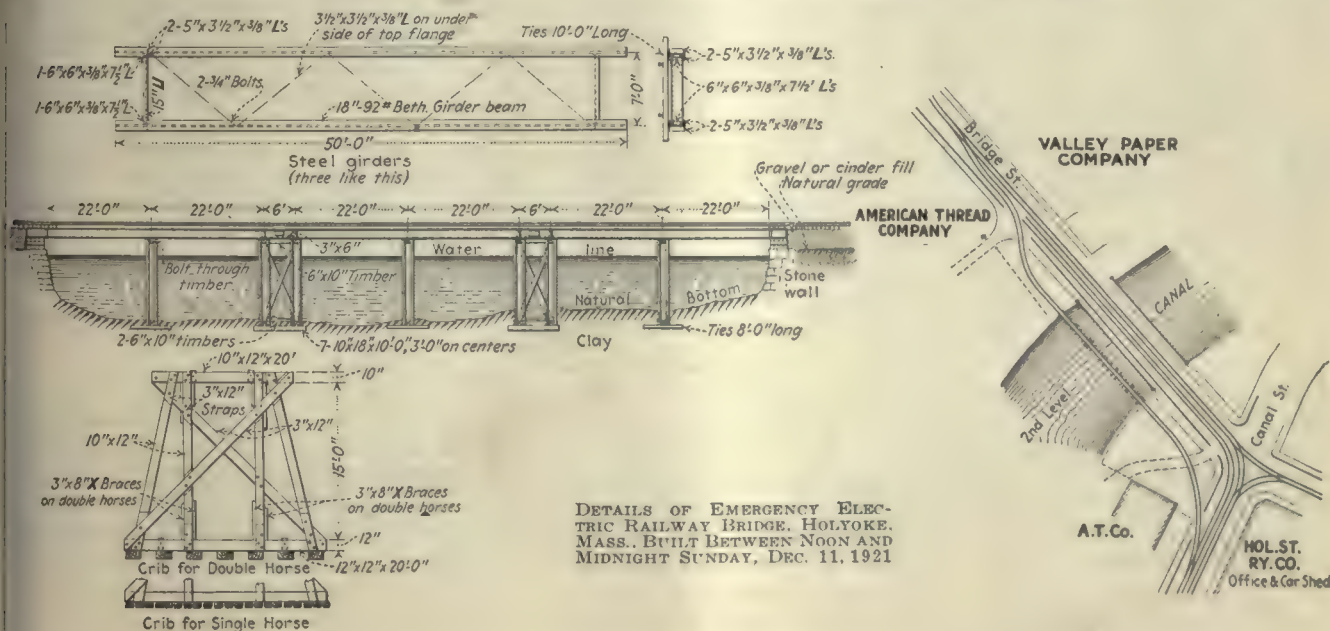
The intermediate horses were then dropped over the wall of the canal and placed under the steel beams resting flat on the bottom but with their bases in their final position. A couple of stakes were driven to keep these bents from sliding and a line from the donkey engine to the top of the bents pulled them into an upright position. As they came up they lifted with them the two steel beams, which of course would then be in their final resting place. One of the sections was then used for a run to roll out the middle section and of the trestle, using the donkey engine for motive power.

Thermal Relay for Apparatus Protection

A LINE of thermal relays has been developed by the Westinghouse Electric & Manufacturing Company, which permits control of the circuit in such a way as to open it approximately when a piece of apparatus to be protected has reached a predetermined temperature. This is accomplished by providing in the relay a certain amount of resistance and of thermal capacity so that its temperature rises substantially with that of the apparatus to be protected. By adjustment of the relay the temperature at which it will open the circuit can be predetermined.

The operating mechanism of the relay consists of a number of sheets of thermostatic metal arranged in series or in parallel and with varying resistance, according to the desired current-carrying capacity. A contact is attached to one of the elements and is normally held with an initial tension against a stationary contact. At the proper temperature the bending of the thermostatic metal takes up this initial tension and the contact opens, thus opening the holding coil of a small circuit breaker to open the main circuit.

The relay may be provided with a pointer to indicate its temperature and thus furnish a guide to the temperature of the machine which it protects.



DETAILS OF EMERGENCY ELECTRIC RAILWAY BRIDGE, HOLYOKE, MASS. BUILT BETWEEN NOON AND MIDNIGHT SUNDAY, DEC. 11, 1921

When Preservative Treatment of Wood Is an Economy

ALTHOUGH any set of timbers may be made more resistant to decay by preservative treatment, such treatment may not always be economical, even though the timbers are to be exposed to the most severe fungus attack. If the timbers are to be in service for a short time only, durability is unimportant, and any kind of preservative treatment would obviously be a waste of money. If, on the other hand, the wood is naturally of low durability and is to be used in a permanent location, it is easy for preservative treatment to show great savings. Between these two extremes there are any number of instances in which it is a more difficult problem to determine whether or not preservative treatment will pay. The United States Forest Products Laboratory has compiled some valuable information along this line, which is abstracted below.

If a timber user knows the average life that treated and untreated timbers are giving and the cost of each in place, he can easily compute, with the use of the accompanying table, the relative annual costs of maintaining the two. Assume as an extreme case, for example, that untreated timbers are giving an average life of two years and that their cost in place is \$6 per set. Assuming an interest rate of 7 per cent, the table shows that timbers which need replacement every two years cost annually \$0.553 on every dollar of their cost in place. For the \$6 set, then, the annual maintenance cost would be 6 times \$0.553, or \$3.32. Treated timbers, the user may find, give an average life of fourteen years and cost \$7.50 per set in place. The annual charge on timbers with a fourteen-year life is found in the table to be \$0.116 on each dollar of their cost in place. The annual cost of maintaining the \$7.50 treated set, therefore, would be 7.5 times \$0.116 or \$0.87. Preservative treatment, then, would save this user annually \$2.45 per set.

If a timber user knows the cost of treated and untreated timber and the average life of the untreated timber only, he can estimate how long treated timber would have to last to be as cheap as untreated timber. In the case discussed above, the untreated timber cost \$6 in place; the treated, \$7.50; and the untreated timber was lasting two years. The annual charge on the untreated set was found to be \$3.32, and since the annual charge on the \$7.50 treated set is to equal this, we may set up the equation, $7.5 \times y = \$3.32$; then y (the annual charge on \$1 expenditure) = $\$3.32 \div 7.5$, or \$0.443. Referring again to the table and looking along the 7 per cent interest rate now, we find that an annual charge of \$0.443 on the dollar falls between the two-year and three-year columns and evidently at a

point equivalent to about a 2½-year life. It can readily be seen from this that if treatment adds only three-quarters of a year to the life of the timbers, it would pay for itself, and the user could be sure from the experience of others that it would add much more than this and would therefore be profitable.

Advertising on Berlin Transfers

IN BERLIN, owing to the high cost of railway operation, advertising is being printed on both the front and back of transfer tickets and fare receipts. Some of this advertising is artistic, as shown by the advertise-

Fahrschein und Quittung über 1.50 M. Gültig für die ganze Fahrt unter den im Wagen aushängenden Beford.-Beding.	Die billige Kaufgelegenheit  stellt sich ein beim (Wenden)
16563	
M 534	
Berliner Straßenbahn W 9, Leipziger Platz 14	
Ausweis für diejenige Person und Fahrt, f. die gelöst.	

Fahrschein und Quittung über 2 M. Gültig für die ganze Fahrt unter den im Wagen aushängenden Beford.-Beding.	 Beim Wandern ist mein Weggenoss! Das Lautenspielen von BEIL & VOSS Wanderer, dem Frühling geht's entgegen Mit hellem Sang auf Weg und Stegen, (Wenden)
85014	
V 636	
Berliner Straßenbahn W 9, Leipziger Platz 14.	
Ausweis für diejenige Person und Fahrt, f. die gelöst.	

BERLIN TRAMWAY TICKETS CARRY ADVERTISING ON FRONT AND BACK

ment of the dealers in musical instruments on one of the tickets reproduced. In this case a verse of poetry is begun on the front of the ticket, and if the reader wishes to see the rest of it he has to turn to the back of the ticket, which carries the full advertisement of the dealers. The shoe dealer on the front of the transfer says simply that "the greatest bargain sale is at," creating curiosity on the part of the reader to see where the sale is taking place.

The charge for a single fare on the surface lines of Berlin is now 2 marks, and it is stated that the fare will probably be increased to 5 marks in the early future. Before the war a mark was worth 24 cents.

ANNUAL CHARGES ON EACH DOLLAR OF COST OF TIMBERS IN PLACE

Interest Rate Per cent	Life in years before replacement																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	18	20	22	24	26	28	30	
4	1.04	0.530	0.362	0.275	0.225	0.191	0.166	0.148	0.132	0.123	0.114	0.106	0.100	0.094	0.086	0.079	0.073	0.069	0.065	0.062	0.060	0.058	
5	1.05	0.538	0.367	0.282	0.231	0.197	0.173	0.155	0.140	0.129	0.120	0.112	0.106	0.101	0.092	0.085	0.080	0.076	0.072	0.069	0.067	0.065	
6	1.06	0.545	0.374	0.288	0.237	0.203	0.179	0.161	0.148	0.135	0.126	0.119	0.112	0.107	0.098	0.092	0.087	0.083	0.079	0.076	0.074	0.070	
7	1.07	0.553	0.381	0.295	0.243	0.209	0.185	0.167	0.153	0.142	0.133	0.128	0.121	0.116	0.109	0.103	0.097	0.092	0.088	0.086	0.083	0.081	
8	1.08	0.561	0.388	0.302	0.250	0.216	0.192	0.174	0.160	0.149	0.140	0.133	0.127	0.121	0.113	0.107	0.102	0.098	0.095	0.093	0.090	0.089	
9	1.09	0.568	0.395	0.309	0.257	0.223	0.199	0.181	0.167	0.156	0.147	0.140	0.134	0.128	0.120	0.114	0.110	0.106	0.103	0.101	0.099	0.097	
10	1.10	0.576	0.402	0.315	0.263	0.227	0.205	0.187	0.173	0.162	0.153	0.146	0.140	0.135	0.128	0.121	0.117	0.114	0.110	0.109	0.106	0.106	

Based on the formula, $A = \frac{P(1+r)^n}{(1+r)^n - 1}$ in which A = annual charge,
 P = amount of initial investment,
 n = number of years in the recurring period (the average life of the timber).
 r = the rate of interest expressed decimally.

Letters to the Editors

Arc Welding to Rail Webs

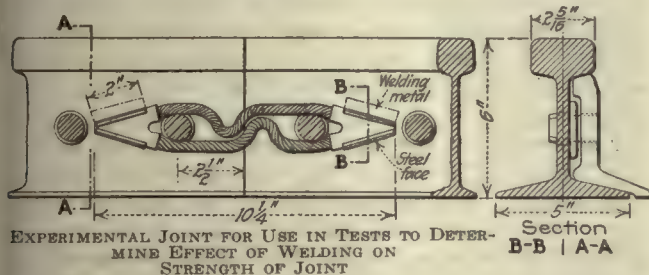
PUBLIC SERVICE RAILWAY

NEWARK, N. J., April 19, 1922.

To the Editors:

In the *Engineering News-Record* of March 30, page 524, appeared an article describing the effect on some 6-in. tee-rails of applying rail bonds to the rail web by means of the electric arc, as determined by a series of tests made by the Pittsburgh Testing Laboratory for the Canadian Engineering Agency, Inc., New York.

The tests were made under the standard drop-test machine specifications of the American Railway Engineering Association, 2,000-lb. weight with 15-ft. fall, some of the rails having bonds applied to their webs and others without the bonds. The bonded rails all



broke on the first blow while the unbonded rails required from three to five blows before fracture occurred. In a second series of tests wherein the height of the drop was reduced to 10 ft., the bonded rails all broke on the first or second blow, whereas the unbonded rails required from four to five blows before failure occurred.

While the article did not state the type of electric arc used, whether carbon or metallic electrode was employed, the results obtained are nothing more than could reasonably have been expected. While no definite conclusions can be drawn as to the results which would have been obtained under actual service conditions, it is quite generally conceded that the web of a rail is not the best place in which to install a welded bond. The metal has quite a thin section at this portion of the rail and is that portion in which a considerable part of the internal stress due to unequal rate of cooling during rolling has developed. The intense heat of the electric arc, especially in the case of the carbon electrode or the resistance type of welders, would naturally affect the web more, because the heat is not conducted away from the weld and distributed through a large mass of metal as would be the case if the weld had been made on the head or base of the rail. Welding of plates to rail webs by such methods as that employed in making the Lorain bar weld has a materially different effect, because the temperature rise at the weld is accomplished much more gradually and the effect is not localized to the same extent as in the case of the arc weld, where the metal is suddenly changed from a solid to a molten state and suddenly solidified again. This sudden change would certainly increase brittleness of the steel at the point of weld and would cause the results the test produced.

HOWARD H. GEORGE,

Engineer of Maintenance of Way.

EDITORS' NOTE—The article in the *Engineering News-Record* to which Mr. George refers was entitled "Steel

Rails Embrittled by Welding Bonds." It describes tests which were made in connection with the development of a theft-proof rail bond for the Mexico City street railway system. The bond was of the form shown in the accompanying illustration, comprising two strands of No. 0 copper cable connected at the end by spear-shaped cast-copper terminals faced along the outer edge with $\frac{1}{8}$ in. of steel. The bond was designed to fit under the standard splice bar, passing around the bolt, and was to be attached to the rail web by means of electric arc welding of the steel facing to the rail metal.

Bonds were attached to about half the number of test pieces, in some cases with one of the terminals at mid-length of the specimen, in other cases with the two terminals symmetrically placed with respect to the mid-length of the rail. No more welding material was used than would be considered good practice, the test report states, and the welding process did not heat the rail to a noticeable degree.

In addition to the information which is quoted by Mr. George, the report states that quite abnormal shapes of fracture resulted in the case of the bonded specimens.

It was concluded from these tests that "serious injury is done to a rail by the welding process applied to its web," and the welded bonds therefore were not adopted for use. A form of bond passing under the splice and then attached to the head or base of the rail by welding may be adopted, however, as welding to the more massive parts of the section is not believed to injure the rail.

"The 'Ruthless' Trackless Trolley. It Is Destroying the Roads."

NEW YORK CITY, April 22, 1922.

To the Editors:

The above is a newspaper headline to an article on the effect of the trackless trolley on the cost of highway maintenance in the Borough of Richmond (Staten Island), where the city of New York is operating a trackless trolley system. This system was described in the issue of the *ELECTRIC RAILWAY JOURNAL* for Oct. 15, 1921. It appears that the authorities in charge of the maintenance of the highways have petitioned the Board of Estimate for \$281,600 for repaving two streets whose maintenance has become necessary because of the damage caused by the trackless trolley. The Borough President, in his request for funds for repairs, says: "As the present pavement is being destroyed by the trackless trolley operated by the city," etc. It further appears that 5,600,032 nickels will be needed to pay for the pavement.

The city is finding out that there is some virtue in trolley tracks with pavement maintained by the railways through the aid of the fare payers, thus again proving that the car rider is being taxed for pavement maintenance. Meanwhile, the Richmond authorities are attempting to have the pavement repaired at the expense of the Greater City at large in order to relieve the local taxpayers and property owners fronting on the streets to be repaved. Thus the entire city is asked to subsidize a supposedly cheap form of transportation which is not so cheap when road damage is considered, especially where the trackless trolley fare does not amortize maintenance costs.

This should serve as a warning to those railway companies which may be considering the trackless trolley

or even the motor bus to beware of any new entangling alliances with franchises which may require pavement maintenance. It also indicates the timeliness of the American Association's recently expressed desire for information on the cost of construction and maintenance of the public highways.

The writer considers that the situation found in Richmond Borough practically confirms some of the statements made in his letter to you dated Jan. 31, 1921, which appeared in the issue of the JOURNAL for Feb. 5, 1921. It was there noted that it will be necessary to build good roads for trackless trolleys, and that good roads cost about as much as good tracks. The experiment in Richmond Borough seems to prove also that it costs a lot of money to maintain roads for bus operation. What would happen to the streets in New York if their operation were to be multiplied many hundred-fold as desired by the Hylan bus or bus transit policy?

"ENGINEER."

*Psychological Tests Must Be Based on Facts**

NEW YORK, N. Y., April 20, 1922.

To the Editors:

The steps being taken by the American Electric Railway Transportation & Traffic Association, through its committee on personnel and training, to apply scientific methods in the selection and development of trainmen have been of great interest to me. It is especially gratifying to see the clear conception, on the part of the committee, of the value of utilizing in the solution of this important problem the accumulated scientific knowledge in the field of selection. The benefits to be derived from improving the personnel of platform men have been set forth in the reports of the committee and in the article by Dr. John Leeming in the March 11 issue of the ELECTRIC RAILWAY JOURNAL. Certainly no one will fail to see the practical results and actual savings in dollars and cents to be obtained through increased good will, the cutting down of operating costs and the reduction of accident claims, made possible by the adoption of sound principles of dealing with human relations. On the one item of the reduction of accident claims alone a large annual saving can be made.

The committee has made definite recommendations that psychological tests be used in the employment procedure and expects, I understand, to suggest concrete tests for use of the membership. It seems especially fitting at this juncture in the program, before definite tests or methods are tried out or adopted, for the JOURNAL through its columns to discuss the procedure which should be followed in order to avoid unnecessary pitfalls and obtain sound and permanent results.

While the use of tests is closely interwoven with the employment procedure and cannot be separated from it, my remarks will largely be confined to the requirements in the preparation and adoption of a testing program. To those who have been directly interested in the development and application of psychological tests to industry, it has been proved over and over again that getting the right start and adhering to a definite technique is of paramount importance. Probably the best thing I can do at this time is to point out just what a psychological test is, and second, to indicate the steps necessary in their preparation and application.

*The author of this letter has been engaged for years in the subject of practical psychology as applied to the personnel in different branches of industry.

What is a psychological test? To one it means a so-called character analysis; to another it means a series of information questions, similar to the "famous" Edison questionnaire; and to yet another it is simply a sort of examination or interview. This general misconception, coupled with the widespread exploitation on the part of the charlatan, is a matter of deep concern to the true psychologist. The long-headed business man, who would not think of turning over a technical piece of engineering to any but a trained engineer, or of turning over his books for an audit by any but a trained accountant, will in many cases, when it comes to applying tests, listen to almost any scheme put up to him. There seem to be two reasons for this attitude: First, each one of us is vitally interested in the human problem involved; second, the tests themselves seem to be quite simple, which causes a tendency to feel that they are easily prepared.

Just what a test is must be clearly understood. A psychological test is not an exercise, nor a problem *per se*, but a standardized task or series of tasks used as an instrument or tool to measure a particular trait or ability. The performance of the task is simply a means of taking a "sampling" of the ability, and is not a complete measure of it. In this manner, an opportunity for expression of the trait is given, and on the basis of this "sampling" it is possible to predict or estimate the total ability. The reliability of the test depends largely upon the task selected making a fair sampling. The principle is the same as that involved in testing steel, in testing chemicals, or in any kind of scientific test. In each case an analysis is made and what is to be tested for determined. Then standards are set up and samplings taken, and on the basis of what the samplings show an estimate of the whole is made.

Obviously, then, psychological tests for use in selecting men for definite types of work cannot be prepared by simply taking tests which have been used for an entirely different purpose or a different type of job. This error is probably the most common one made by the uninitiated. It is possible to get together a good collection of tests; but a test in itself means nothing. It is the interpretation which gives results, and in order to get the proper interpretation a definite procedure and technique must be followed in the preparation. The results of a good test may be entirely vitiated by preconceived ideas which lead to erroneous conclusions. One of the most common mistakes made is the assumption that the most intelligent man will be the best for a particular type of work. It has been conclusively proved that there is a range of intelligence which is best for each type of work; that there is an upper limit as well as a lower limit which should be adhered to if all the factors entering into efficiency and contentment are to be recognized. This principle is closely related to the problem of training and promotion, and in practice affects the policies and organization of each company. If opportunities for promotion are present, a higher type of ability may be secured and the range made wider than if the selection is made with the intention of keeping the man on the one job.

Experience has shown that the steps to be followed in preparing tests are: (1) A careful analysis of the job for which the tests are to be used, to determine the essential human qualities involved in efficient performance. (2) The preparation of tests for these qualities, tests which are simple and easily administered. (3) The standardization of the tests through tryout on men of

known ability. (4) Revision of the tests in light of the findings, and setting up of standards for use in the selection of new men.

Applying this procedure to the problem before the association, what does it mean? In the first place, there are no tests in existence, other than some mechanical devices such as are described in Dr. Gradenwitz's article in the JOURNAL of Jan. 28, which are directly applicable in the selection of motormen and conductors. It will be necessary, therefore, that a series of tests for this purpose be prepared. The first thing to do will be to make a careful and complete job analysis. Sitting in an armchair and guessing at the qualities involved will not be sufficient, even though one feels that he is familiar with the job. Until a systematic study is made of the duties of trainmen, there is very little basis upon which to proceed. At best, there will of necessity be a great many changes before the exact qualities will be found. When the qualities have been determined, practical tests may be devised. As a result of experience in the army and in industry during the last few years, great progress has been made in simplifying tests and methods of giving them. This experience should be drawn on by the association, for success largely depends upon the practicability of the tests themselves. In carrying out the third step, that of standardization of the tests, a representative group of at least five hundred men of known ability should be selected, preferably from a number of different companies, and the tests given to them, the results being checked against their efficiency on the job. A test is not ready for use until it has undergone such a tryout. Even then, only tentative standards will have been set. Before adequate standards can be determined, a great many revisions of the tests will in all probability have to be made, based on experiences in different companies as indicated by careful records. Standardization will be greatly facilitated in the program of the association by the comparisons which can readily be made, because the almost identical nature

of the work in the different companies will permit the same tests to be used and standard procedure to be followed. Unless provision is made in the program of the association for keeping records of the results obtained in the various companies, adequate standardization will never be possible.

In my estimation, and I want to emphasize this in conclusion, it is better not to start the use of tests at all than to "get off on the wrong foot" by attempting to do in a hurry what requires time and patience as well as expert counsel to do. Testing is not something mysterious; but the utilization of the knowledge already obtained in the field is essential if results are to be permanent and satisfactory. N. L. HOOPINGARNER.

Single and Double-Door Safety Cars

HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

TORONTO, ONT., March 15, 1922.

To the Editors:

We have followed the various communications that have appeared in your journal on the above subject with very great interest, and after careful study have reached the same conclusions as expressed by Mr. Flowers in his letter of March 6, appearing in your issue of March 11.

About three months ago we placed an order with a local car company for twenty-five cars of the safety type and specified our own design rather than the standard, as we are absolutely convinced that satisfactory service cannot be given with the narrow aisles and single doors provided on the so-called standard car. The double doors on our car will be separately operated, and we have also deviated from the old standard by increasing the motor capacity to two 40-hp. motors.

We are thoroughly convinced that the wide aisles and separate entrances must be provided before a satisfactory car of this type can be produced.

FREDERICK A. GABY,
Chief Engineer.

One of the Busiest Traffic Streets in the World



THIS VIEW SHOWS THE FOUR LINES OF CARS ON LOWER MARKET STREET, SAN FRANCISCO. THE SPECTATOR IS LOOKING SOUTHWEST ON MARKET STREET FROM FRONT STREET

Lower Court Is Upheld in Galveston Fare Case

United States Supreme Court Indicates Galveston Company May Reappeal to City for Relief from Five-Cent Fare Order Under Changed Economic Status if Court's Prophecy Has Proved Wrong

Action of the City Commission of Galveston, Tex., in fixing 5 cents as the fare to be charged there has been upheld by the United States Supreme Court. This marks an end to fare litigation that has been waged for several years. The opinion, delivered by Justice Brandeis, sustained the action of the United States District Court at Houston in dismissing without prejudice the application for an injunction on the part of the Galveston Electric Company.

The Opinion of the Court

THE street railway system of Galveston was started as a horse-car line in 1881. It was electrified about 1890 and after the hurricane of 1900 was largely rebuilt. Upon sale on foreclosure the railway passed in 1901 to a new company, and in 1905 it was purchased by the Galveston Electric Company, which supplies to the inhabitants of that city also electric light and power. At no time has the full fare on the railway been more than 5 cents—except during the period of eight months, from Oct. 1, 1918, to June 5, 1919, when 6 cents was charged. This higher fare was authorized by ordinance of the municipal Board of Commissioners, which possesses regulatory powers, and on June 5, 1919, the same board reduced the maximum fare to 5 cents. The latter ordinance was passed after a hearing and a finding by the board that with the reduced rate the company would continue to earn a fair return. Under the 1919 ordinance the company operated for eleven months. Then it brought this suit, in the federal court for southern Texas, to enjoin its enforcement. The company contends that the fare prescribed is confiscatory in violation of the Fourteenth Amendment; the city that it is sufficient to yield a return of 8 per cent on the value of the property used in the public service.

A temporary injunction having been denied, the court appointed a master to take the evidence and make advisory findings. There was substantially no dispute concerning the facts past or present. It was assumed, in view of then prevailing money rates, that 8 per cent was a fair return upon money invested in the business. The experts agreed on what they called the estimated undepreciated cost of production on the historical basis; that is, what the property ought to have cost on the basis of prices prevailing at the time the system and its various units were constructed. They agreed also on the amount of gross revenue, and on the expenditures made in operation and for taxes, except as hereinafter stated. The differences between the parties resulted, mainly, either from differences in prophecy as to the future trend of prices or from differences in legal opinion as to the elements to be con-

sidered in determining whether a fair return would be earned. These differences affected both the base value and the amount to be deemed net revenues. The master, who heard the case in October, 1920, and filed his report in November, made findings on which he advised that the fare was confiscatory. The District Judge, who heard the case in January, 1921, found a much smaller base value and much larger net revenues, stated that he did not deem it necessary to determine whether the ordinance "will produce exactly 8 per cent or a little more or a little short of it," declared that he was "not satisfied that the ordinance produces a return so plainly inadequate as to justify this court in interfering with the action of the municipality in the exercise of its rate-making function" and in March, 1921, entered a decree dismissing the bill without prejudice. In April he denied a petition for rehearing, 272 Fed. 147. The case comes here on appeal under Sec. 238 of the Judicial Code.

The undepreciated reproduction cost on the historical basis—which seems to be substantially equivalent to what is often termed the prudent investment¹—was agreed to be \$1,715,825. The parties failed to agree in their estimates of the depreciation accrued up to 1921. The master estimated that, based on the 1913 price level, it was \$390,000, and this estimate the court accepted. Thus measured, the value of the property, less depreciation, was \$1,325,825. The court found that the net earnings under the 5-cent fare for the year ended June 30, 1920, had been \$90,159 and for the year ended Dec. 31, 1920, \$109,286, and estimated that for the year ended June 30, 1921, it would be at least \$111,285. The return so found for the year ended June 30, 1920, is 6.8 per cent of \$1,325,825; for the calendar year 1920, 8.2 per cent and for the year ended

June 30, 1921, 8.4 per cent. The master made calculations only for the year ended June 30, 1920, and, mainly² because he allowed an amount for maintenance and depreciation equal to nearly 18 per cent of the prudent investment for the depreciable property (less accrued depreciation), found the net earnings to be only \$50,249.60. This sum is 3.8 per cent on the prudent investment value, less depreciation. But neither the District Judge nor the master reached his conclusion as to net return by a calculation as simple as that indicated above.

DETERMINATION OF VALUE

First—As the base value of the property, master and court took—instead of the prudent investment value—the estimated cost of reproduction at a later time, less depreciation; and in estimating reproduction cost both refused to use as a basis the prices actually prevailing at the time of the hearings. These had risen to 110 per cent above those of 1913. The basis for calculating reproduction cost adopted by all was prophecy as to the future general price level of commodities, labor and money. This predicted level, which they assumed would be stable for an indefinite period, they called the new plateau of prices. As to the height of this prophesied plateau there was naturally wide divergence of opinion. The company's expert prophesied that the level would be 60 to 70 per cent above 1913 prices; the master that an increase of 33½ per cent would prove fair, and the court accepted the master's prophecy of 33½ per cent.³ Thus both master and court assumed a reproduction cost, after deducting accrued depreciation, of about \$1,625,000. On this sum the net earnings found by the court yielded—after deducting a 4 per cent depreciation annuity on property subject to depreciation, a maintenance charge, and a charge for taxes, other than the federal income tax—a net return of 5½ per cent for the fiscal year ended June 30, 1920; of 6.7 per cent for the calendar year 1920, and the promise of more for the fiscal year ended June

¹He allowed also on account of federal income taxes a sum of \$8,008, which the court disallowed.

²From the agreed valuation of \$1,715,825, the court deducted \$425,117 for property not subject to this appreciation—land, already given its market value, and capital acquired recently (all acquisitions before Jan. 1, 1915, being assumed to have been at the 1913 price level, all since that date at the new level). The balance was appreciated ½; the \$425,117 was added again; and accrued depreciation, likewise appreciated ½, was subtracted. The court thus obtained a base value of \$1,626,061. The master's figure was slightly smaller (but for his inclusion of development cost and brokerage) for he excepted more property from this 33½ per cent appreciation.

³That is "the estimated undepreciated cost of reproduction of railway property of the company on the historical basis, exclusive of franchise value, going concern value, bond discount and brokerage fee," but with land and right of way which cost about \$15,000 estimated at their present value of \$58,836. It was also agreed, for the purpose of dividing joint items, that one-fifth of the property of the company was devoted to its light and power business.

⁴See Richberg, 31 Yale Law Journal, 263, 266, 279; Hale, 30 Yale Law Journal, 710, 720; Henderson, 33 Harvard Law Review, 902 and 1031; Friday, 36 Quarterly Journal of Economics, 197, 211.

30, 1921. But to fix base value the master added, and the court disallowed, items aggregating nearly \$600,000, which must now be considered.

The most important of these items is \$520,000 for "development cost." The item is called by the master also "going concern value or value of plant in successful operation." He could not have meant by this to cover the cost of establishing the system as a physically going concern, for the cost of converting the inert railway plant into an operating system is covered in the agreed historical value by items aggregating \$202,000. These included, besides engineering, supervision, interest, taxes, law expenses, injuries and damages during construction, the sum of \$73,281 for the expenses of organization and business management. The going concern value for which the master makes allowance is the cost of developing the operating railway system into a financially successful concern. The only evidence offered, or relied upon, to support his finding, is a capitalization of the net balance of alleged past deficits in accordance with what was said to be the Wisconsin Rule.⁴ The experts calculated this sum in various ways. One estimate placed the development cost at \$2,000,000; a more moderate estimate by the company's expert was \$575,300, and the city's expert made a calculation by which he estimated this so-called cost at \$212,452.

INTERPRETATION OF "DEVELOPMENT COST"

If the rule were that a prescribed rate is to be held confiscatory in case net earnings are not sufficient to yield 8 per cent on the amount prudently invested in the business, there might be propriety in counting as part of the investment such amount, if any, as was necessarily expended at the start in overcoming initial difficulties incident to operation and in securing patronage. But no evidence of any such expenditure was introduced; and the claim of the company does not proceed upon that basis. What was presented by the witnesses are studies, on various theories, of what past deficiencies in net income would aggregate, if 4 per cent were allowed as a depreciation annually on the value of the property used. These calculations covered, on one basis, the period of thirty-nine years since the original horse-car line was built; on another, the period of fifteen years since the appellant purchased the property as a going concern. If net deficits so estimated were made a factor in the rate base, recognition of 8 per cent as a fair return on the continuing investment would imply substantially a guarantee by the community that the investor will net on his investment

ultimately a return of 8 per cent yearly, with interest compounded on deferred payments; provided only that the traffic will in course of time bear a rate high enough to produce that amount.⁵

The fact that a utility may reach financial success only in time or not at all is a reason for allowing a liberal return on the money invested in the enterprise, but it does not make past losses an element to be considered in deciding what the base value is and whether the rate is confiscatory. A company which has failed to secure from year to year sufficient earnings to keep the investment unimpaired and to pay a fair return, whether its failure was the result of imprudence in engaging in the enterprise, or of errors in management, or of omission to exact proper prices for its output, cannot erect out of past deficits a legal basis for holding confiscatory for the future rates which would, on the basis of present reproduction value, otherwise be compensatory. *Knoxville vs. Knoxville Water Company*, 212 U. S. 1, 14.

Nor is there evidence in the record to justify the master's finding that a business brought to successful operation "should have a going concern value at least equal to one-third of its physical properties." Past losses obviously do not tend to prove present values. The fact that a sometime losing business becomes profitable eventually through growth of the community or more efficient management, tends to prove merely that the adventure was not wholly misconceived. It is doubtless true, as the master indicated, that a prospective purchaser of the Galveston system would be willing to pay more for it with a record of annual losses overcome than he would if the losses had continued. But would not the property be, at least, as valuable if the past had presented a record of continuous successes? And shall the base value be deemed less in law if there was no development cost, because success was instant and continuous? Or, if the success had been so great that, besides paying an annual return at the rate of 8 per cent, a large surplus had been accumulated, could the city insist that the base value be reduced by the amount of the surplus? Compare *Newton vs. Consolidated Gas Company*, decided March 6, 1922.

In determining the value of a business as between buyer and seller, the good will and earning power due to effective organization are often more important elements than tangible property. Where the public acquires the business, compensation must be made for these, at least under some circumstances. *Omaha vs. Omaha Water Company*, 218 U. S.

⁴On the other hand, if what is to be considered in determining the net deficit is not the result of operations from the beginning of the enterprise, but the result of operations since the present owner acquired it—in other words, the return on its investment—we are left without the data necessary to determine the fact. For the record does not disclose what the present company paid when it purchased the property in 1905 as a going concern. For aught that appears, appellant has received full 8 per cent annually on that amount and later additions to capital.

180, 202, 203; *National Waterworks Company vs. Kansas City*, 62 Fed. 853, 865. And they, like past losses, should be considered in determining whether a rate charged by a public utility is reasonable. Compare *Venner vs. Urbana Waterworks*, 174 Fed. 348, 352. But in determining whether a rate is confiscatory, good will and franchise value were excluded from the base value in *Cedar Rapids Gas Company vs. Cedar Rapids*, 223 U. S. 655, 669, and *Des Moines Gas Company vs. Des Moines*, 238 U. S. 153, 169; and the expressions in *Denver vs. Denver Union Water Company*, 246 U. S. 178, 184, 191, and in *Lincoln Gas Company vs. Lincoln*, 250 U. S. 256, 267, are not to be taken as modifying in any respect the rule there declared. Going concern value and development cost, in the sense in which the master used these terms, are not to be included in the base value for the purpose of determining whether a rate is confiscatory.

HYPOTHETICAL BROKERAGE FEES DISALLOWED

The other item included by the master in determining base value, but disallowed by the court, is \$67,078 for brokerage fees. There is no evidence that any sum was in fact paid as brokerage, and there was included, as above shown, the sum of \$73,281 for organization and business management in calculating the historical reproduction cost. The finding of the master rests upon testimony that bankers customarily get, in some form, compensation equal to 4 per cent on the money procured by them for such enterprises.⁶ But compensation for bankers' services is often paid in the lessened price at which they take the company's securities, and is thus represented in the higher rate of interest or dividend paid on the money actually received by the company as capital. The reason given by the master for including the allowance for an assumed brokerage fee is that a brokerage fee is "a normal incident of large industrial investments and has not been amortized," since "the record shows that the plant has been operated at a loss." If base value were to be fixed by the money expended, brokerage fees actually paid might with propriety be included, as are taxes paid pending construction. But as the base value considered is the present value, that value must be measured by money; and the customary cost of obtaining the money is immaterial. We cannot say that the court erred in refusing to include in base value an allowance for hypothetical broker's fees.

The appellants insisted also that the base value should be raised by assuming that the future plateau of prices would be 60 to 70 per cent above the historical reproduction value instead of 33½ per cent as the master and the court assumed. The appellees insisted, on the other hand, that an item of \$142,281 for

⁶The record cost of the property was originally used as the base for this calculation. But the figure \$67,078 was tacitly agreed by both parties to be the amount, if any, that should be allowed for brokerage.

⁵Hill vs. Antigo Water Company, 3 Wis. R. Com. Reports, 623, 705-723. But see *Cunningham vs. Chippewa Falls Water Company*, 5 Wis. R. Com. Reports, 302, 315; *Appleton vs. Appleton Water Works Company*, 5 Wis. R. Com. Reports, 215, 277; *In re Purchase Racine Water Works Plant*, 19 Wis. R. Com. Reports, 83, 140.

grade raising included by master and court in the historical cost should be eliminated. We cannot say there was error in over-ruling these contentions.

DEPRECIATION, MAINTENANCE, TAXES

Second—Concerning deductions to be made from gross revenue in order to determine net earnings, the court differed from the master in regard both to the yearly charge for maintenance and to the depreciation annuity. It appeared that in the fifteen years since appellant acquired the system in 1905, the average annual expenditure for maintenance had been \$42,771; that during the war the property had been admittedly undermaintained; that the expenditure was \$64,108 in the calendar year 1919; \$80,322 in the fiscal year ended June 30, 1920, and \$90,861.28 in the calendar year 1920. The court estimated the proper charge for current maintenance at \$70,000, and allowed, in addition, a depreciation annuity of \$45,245 (that is, 4 per cent on property subject to depreciation) to provide a fund out of which annual replacements and renewals could be made. Thus the court allowed for the year's depreciation and maintenance \$115,245, which is nearly 14 per cent of the historical reproduction value, and about 10 per cent of the assumed reproduction cost, of the depreciable part of the system. The master allowed \$147,146.40 for maintenance and depreciation during the year ended June 30, 1920. This larger figure was arrived at, partly by charging as cost of maintenance the full \$80,322 expended during that year, and partly by including as depreciable property expenditures for overhead items which the court excluded. The proper annual charge for maintenance is the amount normally required for that purpose during the period; it is not necessarily the amount actually expended within the year. Many items included in the overhead cost of original construction may properly be excluded in calculating the amount of the depreciation annuity. We cannot say that the court erred in limiting the year's maintenance and depreciation allowances to \$115,245.

The company asked to have allowed as a further charge \$29,500 a year on account of what it called deferred maintenance. The contention is that during the war and two years following, the company had deferred maintenance, pursuant to a policy established at the express request of the Government to the end that material and labor might be released for war purposes; that to make good this deferred maintenance would cost \$197,000, and that in order to amortize this amount an annual allowance from earnings of \$29,500 should be made for five years. This is an attempt, in another form, to capitalize alleged past losses, and the request was properly refused.

Third—The remaining item as to which the master and the court differed relates to the income tax. The company assigns as error that the master allowed, but the court disallowed, as a part of the operating expenses for the year ended June 30, 1920, the sum

of \$16,254 paid by the company during that year for federal income taxes. The tax referred to is presumably that imposed by the act of Feb. 24, 1919, c. 18, Secs. 230-238, 40 Stat. 1057, 1075-1080, which for any year after 1918 is 10 per cent of the net income. In calculating whether the 5-cent fare will yield a proper return, it is necessary to deduct from gross revenue the expenses and charges, and all taxes which would be payable if a fair return were earned are appropriate deductions. There is no difference in this respect between state and federal taxes or between income taxes and others. But the fact that it is the federal corporate income tax for which deduction is made must be taken into consideration in determining what rate of return shall be deemed fair. For under Section 216 the stockholder does not include in the income on which the normal federal tax is payable dividends received from the corporation. This tax exemption is therefore, in effect, part of the return on the investment¹.

1922 EARNINGS MAY BE 8 PER CENT

It is thus clear that both in the year ended June 30, 1920, and in the calendar year 1920 the net earnings of the system were less than 8 per cent of its value, whether the value be estimated on the basis of prudent investment or on the basis of the reproduction cost actually adopted. When the court rendered its decision the ordinance had been tested for more than a year and a half—a period ample in ordinary times to test the current effect of the rate prescribed and to indicate its probable effect in the near future. The times here involved were, however, in a high degree abnormal. It did not follow that, because the system had earned less than 8 per cent in 1919 and in 1920, it would earn less than 8 per cent in 1921. A rate ordinance invalid when adopted may later become valid, just as an ordinance valid when made may become invalid by change in conditions. *Municipal Gas Company vs. Commission*, 225 N. Y. 89, 96. Compare *Willcox vs. Consolidated Gas Company*, 212 U. S. 19; *Newton vs. Consolidated Gas Company*, decided March 6, 1922.

The District Judge was obliged to form an opinion as to the probable net earnings in the future. All relevant facts, except as stated, and all appli-

¹It is difficult to see how, on the facts presented, so large a sum as \$16,254 could have been paid on account of the year's operation. Indeed the court, in disallowing the item of federal income tax, deducted not \$16,254, but \$8,008. Even this seems too large, for the net earnings, without deduction of the \$16,254 attributed to income tax, for the year ended June 30, 1920, as found by the master, were \$66,503.60. From this, interest paid or accrued on indebtedness is to be deducted before computing the net income on which the tax is payable. A large part of the capital of utility companies is ordinarily represented by interest-bearing bonds and notes, and there is evidence that such indebtedness of the appellant was "in the neighborhood of \$1,400,000." The interest on this debt chargeable to the railway system would be at least \$50,000. There is further an exemption from tax of \$2,000 of the net income. So a 10-per cent tax on the balance would amount to less than \$1,500.

In the record and briefs elsewhere the income tax is reckoned at between \$8,000 and \$10,000, which is a proper figure if there be an 8 per cent return on \$1,626,061.

cable arguments were fully and clearly presented by the parties and were carefully considered by the court. Although the District Judge treated the master's report as advisory merely, he passed upon the numerous exceptions taken to the master's findings in order to indicate his view on the precise points raised. He allowed some exceptions and disallowed others. Upon petition for rehearing further careful consideration was given to the case. Views expressed in the first opinion on some matters were modified; but these changes did not call for any change in the decree. The District Judge had before him some evidence not before the master; for the company's expert was recalled and testified both to the result of operations of later months in which there was a large increase in travel and to the heavy decline in prices which occurred after October. Concerning actual facts there was substantially no controversy. On the elements to be considered in determining whether the rate would be confiscatory no error was made which could substantially affect the result. His determination whether the prescribed rate would be confiscatory was necessarily based largely on a prophecy, for normal conditions had not been restored. He found that gross revenues were steadily increasing; and that they were larger under the 5-cent fare than they had been during the preceding year when the 6-cent rate was in effect. He was convinced that operating costs would decrease largely during the year. His two opinions show that every element upon which his prophecy should be based received careful consideration. We cannot say that the evidence compelled a conviction that the rate would prove inadequate. Compare *San Diego Land & Town Company vs. National City*, 174 U. S. 739, 754. *San Diego Land & Town Company vs. Jasper*, 189 U. S. 439; *Knoxville vs. Knoxville Water Company*, 212 U. S. 1, 17.

The occasion for the suit was solely the extraordinary rise in prices incident to the war. There was no suggestion that action of the board evidenced hostility to the utility, or that the board was arbitrary or hasty. It had been theretofore considerate of the company's rights and needs. When prices rose rapidly in 1918, it raised the fare limit to 6 cents, although the franchise ordinance prescribed the 5-cent fare. And this was before our decision in *San Antonio vs. San Antonio Public Service Company*, 255 U. S. 547. Its reduction of the fare by ordinance of June 5, 1919, was made after hearing, and was doubtless due to the conviction, shared by many, that, with the cessation of hostilities and the negotiation of the peace treaty, prices and operating cost would fall abruptly. This prophecy, if such there was, proved false. But nearly three years have elapsed since the board adopted the ordinance; and more than a year since entry of the decree below. We know judicially that the period has, in general, been one of continuous price recession, and that the current rates of

return on capital are much lower than they then were. But we cannot know to what extent the important changes occurring have affected either gross revenues or the net return. There is no reason to believe that the board would not give full and fair consideration to a proposed change in rate if application were now made to it. And the District Judge stated in his opinion (272 Fed. 147) that the decree to be entered would be vacated or amended in case it should later appear that the regulating board declined such adjustment of rates as the actual experience of the utility might show it entitled to; and the decree was thereupon entered without prejudice.

The District Judge refused a temporary injunction and did not exact a bond. Hence the only relief we can grant is such as operates *in futuro*. Compare Duplex Printing Press Company vs. Deering, 254 U. S. 443, 464. An injunction should not issue now, unless conditions are such that the prescribed rate is confiscatory. As by the reservation in the decree appellant may secure protection against the ordinance if under existing conditions the 5-cent rate appears to be inadequate, the decree should be affirmed. Compare Lincoln Gas & Electric Company vs. Lincoln, 250 U. S. 256, 268; 257 U. S.

Action by Galveston Company

In anticipation of a decision that would not restore the 6-cent fare but would authorize the company to seek relief through application to the constituted authorities, the Galveston Electric Company has made application to the City Commission for authority to increase its fares to 6 cents. In this connection the company petitioned the City Commission to order an audit of its books to the end that the real conditions in regard to profits or losses of the company might be determined. The City Commission granted this petition and at a meeting just two days before the Supreme Court decided the fare case directed that the books of the Galveston Electric Company be audited.

In discussing the petition for an audit, City Attorney Frank S. Anderson told the commission that without an audit of the traction company's books which would show whether the figures presented by the company were correct, it would be impossible to determine if the profits under a 5-cent fare were inadequate.

On being advised of the decision by the Supreme Court, R. G. Carroll, general manager of the Galveston Electric Company, said:

When the district federal court rendered its decision it found that the return, as reflected by the records, was undoubtedly less than the law regards as fair.

The court, however, felt that the future earnings of the company would be sufficient to permit the company to earn a fair return, and issued its injunction as follows:

"The injunction prayed for will be denied upon a decree so drawn as to permit the complainant to again apply as it may be

advised, should the actual experience of the future prove the prophecy false."

Unfortunately, the earnings of the company have declined, rather than increased, so that the present moment finds the company in a strained financial position and not earning a return that the law regards as fair.

In view of the above conditions, the company has presented its condition to the city commission of Galveston for further consideration.

William E. Tucker, Boston, Mass., who represented Stone & Webster in the trial of the case just decided, expressed the opinion that the most significant thing about the court's decision is the "indirect reaffirmation by the Supreme Court of the United States of the now well-established principle that in Texas a 5-cent fare provision written into a franchise is not a contract between a city and a railway system, but is in fact no more than the exercise of

the rate-making power of the city, and as such is subject to the provision against confiscation contained in the Fourteenth Amendment to the Constitution."

Mr. Tucker explains that the new appeal of the company for relief is based on the ground that under the present operative conditions a fair return on its property is not being earned. He says that while the Supreme Court held that the District Court did not err in its early conclusion, the prophecy of the court in that case with respect to the probable future earnings of the company was wrong, and that the right adheres to the company under the existing circumstances to seek relief either from the City Commission or the District Court.

All-Electric Power Signaling on London Metropolitan Railway

Progressive British Road Has Adopted Signal Improvements as These Became Available, and Is Still Experimenting with a View to Utilizing Latest Inventions.

SOME interesting particulars of the all-electric automatic power signaling on the Metropolitan Railway (London) have just been given to the Institution of Civil Engineers by William Willcox, M. A. M. Inst. C. E. In 1905, when electric service was inaugurated on the Metropolitan Railway, the signaling was mechanically controlled by the Spagnoletti lock and block. The number of trains between Praed Street junction and Aldgate, a distance of about 5 miles, was then 621 per day on both roads, and the number of signal sections was forty-nine. As the number of trains was increased, it was found necessary to introduce automatic signaling controlled by track circuits. The system chosen was all-electric, the work was undertaken in 1908 and this section was completed in the following year. Two power frames were installed, one at Praed Street and one at Aldgate, to handle the traffic at these places; but the existing mechanical boxes were retained at the intervening stations for shunting purposes, with the addition of the safeguards provided by track control. The number of trains in 1913 at Praed Street was 863, and from Baker Street to Aldgate 983, with ninety-one signal sections.

There are about twenty hours daily of continuous passenger traffic, but from 7.30 to 10 a. m. and from 4.30 to 7.30 p. m., the traffic is so dense as to necessitate forty trains each to and from the city per hour. The automatic signaling dealt with these satisfactorily. Similar signaling was therefore installed between Baker Street and Neasden in 1911, the number of signaling sections being increased from twenty-four to fifty-one.

At this date there was only one through line at Baker Street handled by two signal boxes, one at the north end of the station and one at the Circle

end. This through line was track-circuited, and full protection was afforded to train movements, allowing forty-eight through passenger trains to be run to and from the city. All the current used in these installations was continuous.

In 1913 the new Baker Street station was completed, and automatic signaling was installed between the Circle lines and the north end of the station. For this purpose a small signal box was constructed on a retaining wall so as to be out of the way, and in it a power frame of thirty-six levers (6 spare) was erected. This power frame handles more than 1,500 trains a day, and the signalman has no view of the trains except those within station limits immediately in front of his box. Through the station all signals and points are controlled by direct current, but the track circuits are alternating current.

In 1913, also, two new fast lines were constructed alongside the old or local lines from Finchley Road to Wembley Park, a distance of 5 miles. Through the junction at Finchley Road and on to Wembley Park alternating current track circuits were installed, but the signals are worked by direct current as far as Neasden power house. From this point to Harrow-on-the-Hill alternating current is used for the signals as well as for the tracks, and from the same point alternating current is used for both tracks and signals on the local lines to the junction north of Wembley Park station where the fast and local lines converge. From Baker Street to Harrow-on-the-Hill, before automatic signaling, there were thirty-nine signaling sections. Now there are sixty-nine and on the through fast lines there are twenty sections.

In 1919 the signaling from Praed Street station to South Kensington, which was an automatic bar-and-treadle system controlled by direct current, was

*See Federal Reserve Bulletin, January, 1922, pages 5, 79, 113; February, 1922, pages, 156-157.

track circuited with alternating current, but the signals continue to be controlled by direct current.

Current for the supply of power to operate the power frame at Praed Street junction and at Baker Street is obtained from two 130-volt, 5-kw. motor-generators through suitable cables. These supply power for the operation of the points, the signal lamps and train stops, the electro-magnets for back-locks and for the constant indication of power-worked points at Praed Street junction, and also for working the power frame at Baker Street, the total required for both boxes being 2.08 kw.

POWER CONSUMPTION IS SMALL

For operating the track circuits, automatic and semi-automatic signals and train stops, between Praed Street, Bishop's Road and Edgware Road stations, and also between Edgware Road, Great Portland Street and Marlborough Road, and for four large illuminated train indicators at Baker Street, power is obtained from one 15-kw. and two 12-kw., 70-volt motor-generators in Baker Street substation, and the maximum power taken is 14-kw. The mechanical locking in the power frames is ordinary miniature tappet-locking controlled by levers in the ordinary way, the electric locking frame being behind the levers. Illuminated continuous diagrams are placed behind the frames lighted by 75-volt 5-cp. lamps.

All signals at junctions are electrically back-locked, an important safety device which in the further development of electric signaling has enabled point-locking bars to be dispensed with. At all running-stop signals there are train stops which are not connected to the signals mechanically, but electrically, and are controlled by the track circuits in the same manner as the signals, coming to clear and going to danger with the signal. They are also controlled by the track circuit independently of the signal, so that, if a signal failed to go to danger, the arm of the train stop would still go to the danger position.

All electric signals are either automatic or semi-automatic, the former controlled through the track circuits by the passage of the trains themselves, the latter controlled from a signal box when this is in use, but becoming automatic when not so controlled. Inside tunnels the signals are lamp signals, outside they are upper-quadrant semaphores worked by electric motors. Signals are held normally in the clear position by electric power, going to danger by gravity.

All signals are lighted electrically, and station masters light the signals half-way to the next station on either side, by means of a switch at their station. A hundred yards behind each stop signal in the open, fog repeater signals have been erected, the lights of which are placed at the level of the driver's eyes and as near as possible to the running line. By this means an indication is given to the driver

whether the stop signal ahead is at clear or at danger, and if it is at danger he can slow up and avoid being tripped suddenly. The signalmen have fog repeater switches in the signal box by means of which they can light the fog repeater lamps when necessary.

Between junctions it is possible to have a number of trains, *e. g.*, between Finchley Road and Baker Street it is possible to have ten trains. For this reason Mackenzie Holland and Westinghouse train describers were installed, by which the signalman at Finchley Road is enabled to indicate to the Baker Street signalman whether the train terminates there, or is a through train to the city. All points where there are power frames are worked by the Mackenzie Holland and Westinghouse all-electric point machines. These machines are enclosed in a water-tight cast-iron case divided into three compartments. At one end is the motor, in the center are the gear wheels and motor switches, and in the other end is the worm drum that operates the points and the bolt that licks them both ways. Both point blades as well as the bolt lock are individually detected through an electric detector fixed in the 4-ft. way before the signalman can get his signal for a train to pass over that route. These point machines, says Mr. Wilcox, are most successful.

The track relays at Baker Street are of the single element vane type, the shunt by a train averaging 0.9 ohm. The relays used on the direct current system are of the three-coil polarized type, the shunt of which by a train averages 0.15 ohm. The most recent type of relay used is a two-element vane relay, the shunt of which by a train averages 3.4 ohms. The maintenance cost of this type of signaling is not excessive.

AUTOMATIC SIGNALING CUTS COSTS

Before automatic signaling was installed there was 645 levers in use, whereas at present only 311 levers are employed, while the number of signalmen was reduced from eighty-six to twenty-seven and one-half. This meant in 1908 a saving of £127 (about \$615 at then rate of exchange) per week on signalmen's wages, which at the present rate would be around £325 (about \$1,483 at current rate of exchange). During 1920 the whole cost of maintenance—wages and materials—of the signaling of the electrified lines amounted to £123 per route-mile.

Charts have been kept from the beginning of automatic signaling in order to ascertain the number of delays to trains as compared with delays to trains with ordinary signaling, and the comparison works out very favorably for automatic signaling.

Tests have also been made with a three-position light signal as used on the Pennsylvania Railroad. The cost of maintenance is about the same as with two position semaphores, but the light signal appears to possess advantages in some respects, *e. g.*, in the

entire absence of mechanical parts, and in the power of penetration of the light rays both in sunshine and in fog.

Power Test Codes to Be Discussed at Public Hearing

ON MAY 9, during the spring meeting of the American Society of Mechanical Engineers at Atlanta, Ga., a public hearing will be held for the discussion of the three additional power test codes which have reached this stage in their development during the past year. Last May at Chicago this committee, of which Fred R. Low, editor of *Power*, is chairman, presented codes on general instructions, steam engines and evaporating apparatus. It now presents codes on definitions and values, displacement compressors and blowers and hydraulic power plants, all three of which have appeared in *Mechanical Engineering*.

Although these codes have passed through six successive revisions in reaching their present form, the committee will welcome a full and frank discussion by the members of the society and others interested in these three subjects. Persons not planning to attend the spring meeting are invited to prepare written discussions.

Reprints of all three codes revised to date have been prepared by the committee and may be obtained by addressing C. B. LePage, secretary to the committee, at the society's headquarters, 29 West Thirty-ninth Street, New York, N. Y.

In 1918 the power test codes committee of the A.S.M.E. was reorganized to revise and enlarge the power test codes of the society, published in 1915. The committee is a large one, consisting of a main committee of twenty-five, under the chairmanship of Mr. Low, and nineteen individual committees of specialists who are drafting codes for the different classes of apparatus comprised in power-plant equipment.

Automotive Engineers Travel in Rail Car

WHAT was heralded as the first trip in history in which a scientific body has traveled any distance on a standard railroad in a motor rail car was made April 21 by New York members of the Society of Automotive Engineers, who traveled to New Haven to hear Prof. E. H. Lockwood of Sheffield Scientific School discuss power losses in motor-vehicle chassis. Some sixty-odd members traveled in the two Mack A.C. rail cars now in operation on the New York, New Haven & Hartford Railroad. Through the courtesy of the New Haven these cars were taken off their regular lines for the trip.

The average operating speed between the Harlem terminal and New Haven was 27 m.p.h., the speed varying according to traffic conditions. For instance, the average speed in the 16.5-mile stretch between New Rochelle and Stamford was only 20.2 m.p.h., whereas in the next stretch, Stamford to South

Norwalk, one of the cars made 36.4 m.p.h. The maximum speed was about 42 m.p.h., but at the higher speeds there was considerable vibration.

The two rail cars were placed in revenue service on Jan. 30, 1922, one covering an 11-mile route from New Haven to Derby and a 44.8-mile route to New Hartford. The second car runs from Litchfield to Waterbury, a distance of 36.4 miles. So far the two have covered about 23,000 miles in the service of the New York, New Haven & Hartford Railroad. Each car has seats for thirty-six passengers, with a 9 x 6-ft. baggage compartment located at the rear.

Industrial Engineers' Convention

THE Society of Industrial Engineers held its spring convention at Hotel Statler, Detroit, Mich., April 26 to 28. Of interest to electric railway men especially were the papers and discussions on conservation of material, plants and equipment, and labor and the workman.

Chamber of Commerce of the United States

AT THE tenth annual meeting of the Chamber of Commerce of the United States, to be held in Washington May 16 to 18, "European Conditions and Their Effect on American Business" will be the main topic. This announcement was made by the Chamber on April 24, when it made public a tentative program for the meeting. Because of the interest of business men throughout the country in the general subject it is predicted that the convention will be one of the largest ever held by the Chamber.

As in previous years the work of the convention will be done largely in group sessions. Groups representing the major divisions of business will take up the questions before the meeting in their relation to the particular interests or industries comprised within the group.

International Chamber of Commerce to Meet

THE American section of the International Chamber of Commerce has just announced that the next general meeting of the International Chamber will be held in Rome, Italy, the week of March 19, 1923. Before this meeting the International Chamber committees will be able to consider the results of the Genoa Conference in so far as they affect industry and commerce. Based on the views of these committees, constructive plans will be made as to such further steps as should be taken to restore the trade of the world.

The next meeting of the executive committee of the International Chamber will be held in Paris on May 26, and will be followed by a meeting of the board of directors on July 10. At that time plans will be made for the general meeting.

International Railway Congress

THE ninth congress of the International Railway Association is in session in Rome, Italy; the period covered by the congress being April 18 to 30. Abstracts of the reports to the congress on heavy electric traction in a number of important countries have appeared in the following recent issues of this paper: Dec. 3, 1921, page 988; Jan. 28, 1922, page 147; Feb. 25, 1922, page 322.

Canadian Association Convention Plans

THE program for the annual convention of the Canadian Electric Railway Association is complete except for a few details. It will be held at Quebec, June 1 to 8. An abstract of the program follows:

JUNE 1

- 9:00 a.m. Registration.
- Address of welcome.
- Business session, including address of president and reports of committees.
- Inspection of exhibits.
- 1:00 p.m. Get-together luncheon.
- 2:30 p.m. Paper by member.
- 2:45 p.m. Sightseeing around Quebec by trolley (ladies).
- 4:00 p.m. Paper by associate member.
- 5:00 p.m. Inspection of exhibits.
- 7:30 p.m. Association banquet.
- 10:00 p.m. Dancing.

JUNE 2

- 9:00 a.m. Inspection of exhibits.
- 10:00 a.m. Paper by member.
- 11:30 a.m. Trip to Quebec Bridge by boat.
- Informal buffet luncheon on board.
- 2:30 p.m. Paper by associate member.
- 4:00 p.m. Unfinished business.
- Election of officers.
- 4:30 p.m. Inspection of exhibits.
- 9:00 p.m. Annual reception and ball, Chateau Frontenac.

JUNE 3

- Inspection of exhibits, and trips to Montmorency Falls and to Saguenay River.

A. E. S. C. Activities

NINETEEN standards have now been approved by the American Engineering Standards Committee, of which four have been approved as "American Standard," fourteen as "Tentative American Standard" and one as "Recommended American Practice."

This number includes the specifications and tests for portland cement, for which the A.S.T.M. is sponsor, which have been advanced to the full status "American Standard." In the list also as "Tentative American Standard" are the specifications for drain tiles of the same society.

The A.S.T.M. has submitted to the standards committee its specifications for purity of raw linseed oil from North American seed and for purity of boiler linseed oil from North American

seed, as well as its standard methods for chemical analysis of lead, tin, antimony and copper. Approval as "Tentative American Standard" is asked for these specifications.

French Street Railway Association

AN EXTENDED account of the meeting Oct. 20-23, 1921, of the Street Railway & Automobile Association of France (Union des Voies Ferrées d'Intérêt Local de France et des Transports Publics Automobiles de France) appears in *L'Industrie des Tramways*. The papers presented included reports on track construction, car design, power generation and distribution, trackless trolleys, the financial condition of interurban lines, the reorganization of the Paris tramway and bus system, airplane lines, the engineering status of the bus and railway electrification.

American Association News

Camden Section Boasts 283 Active Members

AT THE April 20 meeting of the Public Service Camden Section President C. V. Wallace announced that the section is now the largest, having 283 active members.

The principal speaker at this meeting was former Judge John B. Kates. His principal point was the dependence of one man on another in the present social order. He pointed out that it is utterly impossible for any one to stand alone, whether he occupies the smallest job or one of the greatest responsibility. An employee is practically a nonentity when isolated. The electric railway employee has a definite niche to fill, and if he does his duty effectively, pleasing the people who depend upon him, he will be rewarded in proportion to the extent to which he discharges his obligations. This reward may be represented in ways other than the pay envelope.

H. T. Stevenson, assistant to the president of the Public Service Railway, spoke on salesmanship. He explained that while an officer of the company may see not over ten men a day, a trainman often comes in contact with 500 or more. In the long run public opinion is molded by the platform men. He told of an experience of a Public Service conductor who made a warm friend for the company of a newspaper editor by the simple act of offering him a fare when the editor had left his money at home. Afterward, by way of appreciation, the editor sent the conductor a gift.

At the close of the meeting the entertainment committee announced that the next meeting would be "radio night."

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Home Rule Fight Staged

Campaign Started in Alabama to Have
Regulatory Powers Returned
to Cities

Preparations have been started for a fight at the next session of the Legislature to regain for the municipalities of Alabama the right to regulate the rates and service of their local utilities.

William L. Harrison, Commissioner of Public Utilities of the city of Birmingham, has taken the lead. On April 18 the City Commission adopted resolutions calling upon the Legislature to restore to the city its control over the rates and service of the Birmingham Railway, Light & Power Company, the Southern Bell Telephone Company and the Birmingham Water Works Company.

Steps for the formation of the state-wide organization have already been taken. Letters are being sent out to every Mayor of cities or towns of Alabama which have public utilities of any kind. With these letters are being sent copies of the resolutions adopted by the Birmingham City Commission and the Mayors are being asked to have their Boards of Aldermen or the City Councils adopt similar resolutions. It is planned to call a meeting of representatives of all of the municipalities later.

Similar resolutions to those adopted in Birmingham have been presented to the City Commissions of Montgomery and Mobile. Commissioner Harrison and W. J. Wynn, City Attorney, made a trip to the two cities, where conferences were held with the commissions and assurances were given that Birmingham, Montgomery, and Mobile would act in concert and take the lead in the proposed fight to be waged before the Legislature at its coming session.

At the last session of the Alabama Legislature the public utility act was amended and all power to control or regulate either rates or service of local utilities was taken from the municipalities of the State and was vested in the Alabama Public Service Commission. This body was authorized to fix rates for all local utilities of the State and to prescribe the service regulations. It was also authorized to set aside contracts which had been made by the municipalities with the utilities.

The repeal of this amendment and the return of the right to regulate rates and service to the municipalities will be sought at the hands of the next Legislature, according to the plans now being worked out.

Commissioner Harrison stated that it is not the purpose of the city of Birmingham to open a fight on its utilities or on the Alabama Public Service Com-

mission, but to regain some of the authority it has lost.

The city of Birmingham is now prosecuting a suit against the Birmingham Railway, Light & Power Company seeking to cancel its franchise because of increase in fare from 5 cents, as provided in its franchise, to 8 cents. The increase was granted by the Public Service Commission some time ago. The city is attacking the validity of the public utilities act on several grounds.

Democratic primary elections are to be held early in August and the general elections will be held in November. The meeting of the Legislature will take place some time later. Candidates running in the primary are in many instances making an issue of the Public Service Commission. Many have announced themselves in favor of curtailing its powers.

Asks Removal of One-Man Car Restrictions

The Jacksonville (Fla.) Traction Company, a Stone & Webster subsidiary, and now in receivership, has requested the city to eliminate the section of the ordinance regulating electric railway traffic which requires that a car crew shall consist of a conductor and a motorman. The company proposes to utilize one-man cars. Peter O. Knight, Stone & Webster counsel for the southeast, vice-president of the Tampa Electric Company, and General Manager T. J. Hanlon, Jr., have stated that the one-man car has been the major means of maintaining a nickel fare in Tampa.

Asks Winnipeg to Postpone Option

A. W. McLimont, vice-president of the Winnipeg (Man.), Electric Railway, has asked the City Council to postpone its option to purchase the railway from 1927 until 1937. In his letter to the Council Mr. McLimont stated that this would enable the company to float a satisfactory security and to care for the payment of all outstanding taxes, paving charges and damages caused by electrolysis; to complete the work of removing span wire poles, put wires underground and to make certain other recommended changes. The company, Mr. McLimont stated in this letter, will agree to extend its Talbot Avenue line from the present terminal to Panet Road and to make extensions on the Notre Dame and Academy Road lines, Notre Dame Avenue West Line, McGregor Street and Sargent Avenue lines, to enlarge the St. James subway for double tracking and to install bus service where necessary.

Detroit Preparing the Way

Forces Being Lined Up for Municipality
to Take Over All Detroit
Traction Lines

Initial steps are being taken in Detroit preparatory to the taking over of the Detroit United Railway city lines by the municipal street railway organization. The purchase agreement was ratified on April 17 and a bond issue voted to finance the initial payment and the purchase of supplies and miscellaneous equipment not included in the purchase plan but necessary for efficient operation by the city. An appraisal has been begun and an inventory is being made, including construction materials such as rails, ties, cement and miscellaneous materials.

It is the endeavor of the city officials to complete the inventory before May 15, the date set for the transfer. Officials of the municipal organization plan on taking over the lines with as little interruption of service as possible. Every effort will be put forth to insure efficient operation from the very beginning and to improve the service.

It has been announced by the municipal officials that as many of the present Detroit United Railway employees will be retained as can be used by the city and that preference will be given to employees who are inclined to work along the lines followed by employees of the present municipal lines and in accordance with the ideals of the officials of these lines. The first and most important aim will be to give courteous and efficient service.

It is planned to have a large number of uniformed municipal ownership employees stationed in the congested downtown districts at the most important points to aid in directing traffic.

An increase in the efficiency of the present Detroit United Railway employees has already been noticed since the city voted to take over the Detroit United Railway lines. No further developments have been reached in regard to the wage cut proposed by the Detroit United Railway earlier in the month, and it now appears unlikely that the wage question will be settled before the transfer is made and the lines are being operated by the city. The present plan is not to reduce wages.

Figures as to operating revenue of the Detroit United Railway for the first three months of the year have been submitted to the city by the company. This is the first report of this nature received by the city and the figures will be used as a basis in making up the budget for the entire municipal system combined with the present Detroit United Railway system for the coming year.

Elevated Lease Reported Negotiated

At a conference at the Mayor's office on April 27 attended by Mayor Moore, Thomas E. Mitten, president of the Philadelphia Rapid Transit Company, and Richard Weglein, president of the City Council, an agreement is said to have been reached by which the Philadelphia Rapid Transit Company will operate the Frankford elevated line for the city. The rental terms which the company will share are 1 per cent in 1923; 2 per cent in 1924; 3 per cent in 1925; 4 per cent in 1926; 5 per cent in 1927. The operation of the road will begin Nov. 5 of this year.

Mayor Moore announced after the Frankford "L" conference that the lease agreement would terminate at the end of five years unless the city gives notice that it wishes the lease continued.

In a statement the Mayor said President Mitten asked for co-operation of the administration and councilmanic forces of the city government in transit matters, and while assured of such co-operation it was pointed out that the city would reserve its rights under the 1907 agreement, the valuation proceedings and others of a legal nature.

It was also stated that the matter of extensions was discussed and it was announced that now that the Frankford "L" lease was out of the way, efforts would be made to extend the Philadelphia Rapid Transit System into sections of the city not now provided with service.

Commission Reiterates Its Rate Deflation Policy

In a summary of its decisions issued on April 24 by the Public Service Commission of New York, it is shown that gas, electric light, telephone and electric railway rates throughout the State have been materially reduced since the commission was appointed to office last April by Governor Miller. Furthermore, the policy of the commission, as expressed in the reduction orders, indicates that the commission intends to continue the rate reducing process as the costs of labor and materials decline.

In this connection the statement of the commission refers to an opinion rendered last fall by Chairman William A. Prendergast refusing an increase in fares in Utica, and concurred in by Commissioners Pooley, Van Voorhis, Semple and Blakeslee. In that decision, reviewed at length in the *ELECTRIC RAILWAY JOURNAL* at the time, the attitude of the commission regarding all public utility rates was set forth as follows:

Public utilities, just as other departments of business, must expect to cope with periods of depression and short earnings, just as at other times they enjoy periods of prosperity and full dividends. If the public is expected to make up every deficiency in order to give a utility a good round rate of earning power, then the public is entitled to the benefit of the surplus over the agreed upon earning rate in times of prosperity.

It must be borne in mind that we are not

dealing with the conditions of 1920, nor with the previous abnormal years, but with the present period, which is one of profound economic readjustment. It is with this pregnant fact before us that a decision in this and similar cases must be made.

The commission, up to date, has put into effect about forty orders calling for reduction in rates or suspending proposed increased rates asked for by public utilities. In only seven cases have increases been permitted, and these of a very slight nature to gas and electric light companies in up-state communities where the cost of service is larger than in crowded sections because of the scattered population.

All of the reductions so far ordered are temporary and were made by the commission before the investigations into the various companies were completed. A further revision of these temporary rates will be made at the conclusion of the various hearings.

Learn About Dallas.—A special Dallas edition of "Partners," the official paper of the Dallas (Tex.) Railway, was issued under date of April 5, 1922. It contains some interesting facts and all possible information on the city of Dallas, compiled by the Dallas Chamber of Commerce. With its historical résumé and fine views this copy of "Partners" is something to keep for future use and reference. The pamphlet says that the effective sale of transportation must be based on knowledge of the city. If the Dallas trainmen assimilate one-half of the story they will certainly be living up to their reputation, namely, the best informed group of men in Dallas when it comes to giving information about Dallas.

Suits to Demand Electrification

Suit will be instituted by the municipal authorities of Buffalo, N. Y., against the seventeen railroad lines entering the city to force the companies to file plans for the electrification of their lines. Last November the City Council adopted an ordinance calling for electrification of the railroads by Jan. 1, 1923, and the filing of such plans with the city by Jan. 1, 1922. The failure of the lines to file the plans will prompt the suits. The railroads against which suits are threatened by the City Council are the New York Central, Pennsylvania, Delaware, Lackawanna & Western, and ten others.

Maurice C. Spratt, attorney for the New York Central, says the railroads have no intention of complying with the resolution of the Council, first because of the excessive cost and second because the city has no legal authority to compel the roads to expend such a large sum of money. Railroad engineers have estimated that it would cost the seventeen railroads entering Buffalo about \$116,000,000 to comply with the ordinance. The Erie Railroad's share alone would exceed \$22,000,000, a sum it could not possibly raise, Erie officials say.

Hearing Held on Bacharach Bill

Another hearing was held in Washington before the House judiciary committee on April 25 to consider the Bacharach bill, which would limit the jurisdiction of federal courts as to injunctions in matters pertaining to state public utility orders. The hearing was held before the whole committee, the time being given to the advocates of the measure. Another hearing will be held May 23. Mayor Hylan of New York, Ledyard P. Hale, counsel for the New York State Public Service Commission; John P. O'Brien, Corporation Counsel of New York, and John E. Benton, representing the National Association of Railway & Utilities Commissioners, were among those who appeared before the committee. Among those who listened to the testimony in opposition to the bill were E. A. Harriman, member of the legislative committee of the American Bar Association, and Senator Charles S. Thomas of the Bar Association of Colorado.

The witnesses in behalf of the bill voiced the complaint that state commissions are interfered with by the federal courts. They claimed that as exact justice can be had from the state administrative bodies and the state courts as from the federal courts. The indicated answer to this contention is that, while it is doubtless true in local matters, investors who are not residents of the state naturally look to the federal courts for protection.

Mayor Thompson of Chicago is to be heard on May 23, when the hearings on the measure will probably be concluded. The committee has given a great deal of time to the bill and has had a full explanation of its object. It was evident at the hearing that the opposition to the bill is very strong, especially in states where money is wanted for the extension of railroads and the development of natural resources. It was announced at the hearing that the committee had received telegrams from a number of state commissions opposing the bill on the ground that it would have a tendency, if enacted into law, to exclude capital from public utility enterprises.

Kinsella Mayor of Hartford

Richard J. Kinsella was elected Mayor of Hartford, Conn., April 4, after a campaign in which reduction of car fares was an important issue. Reduction of fares on the lines in Hartford of the Connecticut Company, isolation of the Hartford Division from the state system and curtailment of suburban trolley service during non-rush hours, which he announced as part of his traction plank for the campaign, met with disapproval among business men and taxpayers. They declared that this plan would increase unemployment, inconvenience the public and turn away shoppers from the city. Mr. Kinsella was elected Mayor four years ago, but was defeated at the next election.

Right to Permit an Abandonment a Commission Function

The Montana Public Service Commission was granted final authority over the electric railways of the State in a decision delivered recently by Associate Justice Holloway in the Supreme Court. Judge Holloway reversed action of the Lewis and Clark County District Court in refusing the city of Helena an injunction against the Helena Light & Railway Company.

The railway had announced its intention of abandoning the Kenwood branch on the west side of the city. The city asked an injunction on the ground that the company was violating its franchise. The lower court refused to enjoin the company. The city appealed.

In its decision the higher court held that the Public Service Commission had the power to decide whether the railway had the right to abandon any of its lines on account of heavy losses sustained by insufficient business. Until the state body has acted, it was held, the company must discharge its obligation under its franchise.

Seattle Must Say Yes or No

The question facing residents of Seattle, Wash., at the election on May 2 is this: Shall they accept the proposal to support the municipal street railway by taxation, or shall they refuse it? If they accept it, fares will be reduced from the present 8½ cents to approximately 3 cents. If they refuse it, fares will stay where they are.

Advocates of the proposal for taxation maintenance say that the increased taxation will be more than offset by the reduction of fares. Opponents insist that increased taxes will drive away business. It has been estimated that the new plan would involve an increase in taxes varying in amount from \$5,500,000 to \$6,000,000, or between 20 and 22 mills. The total tax rate would approximate 85 mills. The proposal was brought to vote by an initiative petition. The plan was reviewed in the *ELECTRIC RAILWAY JOURNAL* for March 25, page 534.

Mayor Wants a New Deal

Mayor Hosey of Fort Wayne, Ind., has indicated that the Indiana Service Corporation, Fort Wayne, Ind., will be asked to enter into a new agreement with the city similar to the one surrendered when the company's operation passed completely under the supervision of the State Public Service Commission.

Two petitions of franchises to improve the city lines have been presented to the Board of Works by the company, one for the proposed double tracking of Pontiac Street and the other for the double tracking of South Wayne Avenue. Neither petition has been acted upon, although they have been on file several weeks. Mayor Hosey indicated that permission to carry on the

work will not be granted until the company enters into a new agreement or franchise with the city.

In an effort to settle the Pontiac Street double-tracking proposition, which has been opposed by the residents of Pontiac Street, the railway called a mass meeting of the citizens in that section of the city at the neighborhood school, where it presented its side of the case. The company holds that the Pontiac line carries more traffic than any other line in the city, that new tracks are absolutely necessary and that the amount of traffic on the line will be greatly increased when the International Harvester Company's plant in the eastern end of the city is completed. The meeting was advertised in the local papers and the purpose of the meeting frankly stated in these advertisements.

Publicity Activities Approved by Commission

During various cases before the California State Railroad Commission in recent months in which public utilities have sought increases in rates, several contestants against the commission granting an increase have objected to the expenses for publicity contained in the operating expense exhibits offered to the commission by the utility companies. The contention has been advanced that utilities are not entitled to charge to their operating expenses the cost of advertising and expect the public to pay for it in the manner of increased rates.

To set the public right on this particular issue President Harley W. Brundige of the California State Railroad Commission has given his unqualified approval to the reasonable use of newspaper space by power and other public utilities of the State to promote and extend their business.

Franklin Hichborn of San Francisco questioned the commission as to the right of public utilities to charge advertising to operative account, especially in territory where competition is not a factor. Mr. Brundige has answered this gentleman by letter and has described newspaper advertising by public utilities as the most effective and cheapest form of salesmanship.

The protest to the commission followed the insertion of an advertisement by the Pacific Gas & Electric Company of San Francisco in a Santa Clara County publication, a region where the corporation holds a monopoly.

That utilities in certain fields do not have serious competition does not affect the proper use of advertising, Mr. Brundige contended, and he further pointed out that modern advertising seeks to create new business rather than to take business away from a competitor.

Mr. Brundige held that when advertising is reasonably and wisely used, measured by results obtained, and is not of the political propaganda type, it is a legitimate operating expense.

Reviews Boston Elevated Situation

James F. Jackson, chairman of the board of trustees of the Boston (Mass.) Elevated Railway, in a letter to Walter R. Mein, president of the United Improvement Association, recently stated that the present 10-cent fare could not be lowered until towns upon which the deficit of 1919 was assessed were paid back the money loaned by them. This amounts to \$4,980,151.

Mr. Jackson's letter is a reply to the questions and suggestions presented at a conference between the Boston Elevated Railway and the United Improvement Association on Jan. 30.

To replace the worn-out equipment of the railway with new and modern material and to bring the service to an efficient point would cost about \$6,000,000, according to Mr. Jackson. In three years the annual reserve for depreciation would care for the expenditures which normally should be cared for by current revenue.

The reserve for depreciation, said Mr. Jackson in his letter, is not being set aside as a capital asset. It is, instead, the fund which is being used by the trustees to replace deteriorated equipment. With it were purchased the majority of the 300 new center-entrance cars and eighty one-man cars, sixty-five elevated cars and forty Cambridge subway cars.

The 5-cent fare areas established between each of the long-distance trunk lines is, according to Mr. Jackson, part of the company's theory of developing a local service at a low fare which is "consistent with the flat fare that distributes population from congested centers to outlying districts and that can be made lower as relief from burdens and lessening costs permit."

Transportation Department for City in Prospect

The abolishment of the Department of Public Utilities, and the creation of a Transportation Department, making the Seattle (Wash.) Municipal Railway a separate branch of the city government, is proposed in an ordinance passed by the City Council, which will be submitted to the voters at the May 2 election as a charter amendment. Councilman Oliver T. Erickson, author of the amendment, claimed that the State under recent legislation has taken over most of the work performed by this branch of the city government. The Council was in favor, as a unit, for the charter amendment constituting the city's railway and bus system a separate and distinct department of the city government, and its executive head a member of the board of public works. As approved, the amendment creates the Department of Transportation, with a superintendent of transportation at its head, this official to be appointed for a three-year term by the Mayor, subject to confirmation by a majority vote of the Council.

Financial and Corporate

Interborough Asks \$400,000,000

This Value Is Placed on Rapid Transit Lines as Company's Price for Entering Transit Plan

James L. Quackenbush, counsel for the Interborough Rapid Transit Company, New York, N. Y., served notice on the Transit Commission on April 21 that it could not hope to take over the Interborough at the figure of \$174,221,056 recommended by the commission's valuation bureau. He put in a company value of \$399,873,697 and indicated that somewhere between these two figures there might be a chance of getting together on a price to be paid for turning the property over to the city for operation in connection with the proposed city-wide traction reorganization plan.

The statement was made at the opening of the valuation hearing which was begun on April 21 before the commission. Interborough figures were taken up first and there was a sharp clash between Clarence J. Shearn, special counsel to the Transit Commission, and the Interborough counsel. Mr. Quackenbush threatened to walk out of the hearing unless he was allowed to present the I. R. T. case as he saw fit and without what he termed "ungentlemanly interruptions." Chairman McAneny poured oil on the troubled waters and the matter was smoothed over.

Mr. Quackenbush wanted the commis-

sion to adopt a plan of arbitration to consider the figures of the chief engineer of the Transit Commission upon which the valuations were based. He claimed that the Transit Commission had this right under the dual subway contract. William A. De Ford objected and said that the Transit Commission should not be bound by any such arbitration.

It was decided that it might be feasible to go over the engineer's figures, which were the base figures upon which the valuations were built, in an arbitration with the city, the Transit Commission and the company represented. The commission, however, insisted upon the company bringing out its arguments against the Transit Bureau values at the opening hearing, and this proceeding was followed. The first witness was the Interborough Rapid Transit Company auditor, Edward F. J. Gaynor, who testified on the company figures.

Mr. Quackenbush said that, whereas the commission's valuation bureau had arrived at its figures by taking the cost to produce the property and deducting from it the cost of depreciation or the sum necessary to put it in first-class order, the company held that since the case was not a rate case, but one in which the commission sought to take the property away from the company, it must use a different method of fixing value. A rate fixed on the basis followed by the valuation bureau, Mr. Quackenbush held, could be changed if found unsatisfactory, but in this case

there was no chance for correction. His company, he contended, should be allowed a price equal to the value of the property as of today, with the company allowed all the advantages of increase in values due to advance in market costs.

He said that as the commission had presented the "minimum value" it was the duty of the company to show the maximum. "That does not mean," he said, "that some lower figure might not ultimately be accepted. Somewhere between may be the figure that may be arrived at between the parties, as frequently is the case in all negotiations."

Mr. Quackenbush declared that nothing he said must be taken as an ultimatum that the company would not eventually reach an agreement with the commission. He declared, however, that "the method adopted by the valuation bureau in reporting the lowest possible value could not be adopted by the commission with any hope of success."

"However," he said, "I cannot imagine that the commission can hope or expect that the thousands upon thousands of security holders who have purchased notes and bonds to the extent of \$200,000,000 will consent to accept anything less than the face value of those securities."

In discussing the conferences in 1919 he declared that the inquiry into the affairs of the I. R. T. begun by Mayor Hylan had "blanketed at that time any chance of bringing about a reorganization of the traction companies."

The values for the I. R. T. property, according to the auditor's charges, and on the basis of prices of March, 1922, are shown in the accompanying table.

Short Abandonment Approved

Approval of the application of the Public Service Railway, Newark, N. J., to abandon its tracks and service on Main Street, Metuchen, between Benner's Corner and Amboy Avenue, has been received by the company from the Board of Public Utility Commissioners. At the same time the board dismissed the application of the Borough of Metuchen for discontinuance of a transfer charge on this same line.

The annual revenue for the line for 1921 was \$1,807 and the cost of operation was \$21,020. When the Public Service Railway took over the lines of the Brunswick Traction Company and the Raritan Traction Company, consolidating them into the Middlesex line, operating between New Brunswick and Perth Amboy, the shuttle service was started to carry out the franchise requirement. The distance was less than a mile.

It is probable that the company will ask the commission for permission to abandon its extension on Burnet Street, New Brunswick, N. J. The company is anxious to abandon the line because it is being operated at a loss and because of the cost it would have to bear when the street is repaved.

RECAPITULATION OF BOOK COST OF INTERBOROUGH RAPID TRANSIT COMPANY PROPERTY DEVOTED TO THE PUBLIC SERVICE TOGETHER WITH VALUE OF SUCH PROPERTY FOUND BY REVISING BOOK COST TO CONFORM TO PRICES PREVAILING IN MARCH, 1922

Title	Auditor's Charges	Charges Revised to March, 1922, Prices
Contracts 1 and 2	\$51,832,542(a)	\$91,392,741
Contract 3 and additions	108,079,433	174,113,997
Belmont Tunnel (less \$3,000,000)	9,068,329	5,895,174(b)
Working Capital:		
Supplies	1,769,647(d)	1,769,647
Cash	1,788,206(e)	1,788,206
Totals	\$172,538,157	\$274,959,765
Manhattan third tracking	\$22,033,751	\$29,146,933
Elevated extensions	13,818,096	18,101,536
Manhattan power plant improvements	6,035,645	9,023,048
Additions to company lines	341,350(c)	341,350
Working Capital:		
Supplies	94,381(f)	94,381
Cash	80,684(g)	80,684
Totals	\$42,403,907	\$56,787,932
Grand totals or value of property for rate case	214,942,064	331,747,697
Add value of lease	68,126,000	68,126,000
Value for purpose of sale or exchange	\$283,068,064	\$399,873,697

(a) Does not include amounts paid in stock or cash to acquire Subway Construction Company assets and McDonald's one-quarter interest in subway lease.

(b) These figures represent auditor's charges with revised interest and taxes based upon a reasonable construction period. Cost of Belmont Tunnel (except the \$3,000,000 allowance) not brought up to 1922 prices.

(c) Not revised to 1922 prices.

(d) This represents 60 per cent of total operating supplies carried for entire subway and Manhattan system.

(e) This sum represents one month's operating expenses and is a fair and reasonable allowance for cash working capital.

(f) Supplies on account of elevated extensions.

(g) One month's operating expenses of elevated extensions as cash working capital.

The figures for contracts 1 and 2 Belmont Tunnel are based upon auditor's records of Dec. 31, 1921, and as to contract 3 and certificates they are based upon auditor's records of Jan. 31, 1922.

The figures for operating supplies are based upon the book cost of the supplies in hand Feb. 28, 1922, and the cash part of working capital upon operating expenses for the month of January, 1922.

TABLE I—COMBINED INCOME STATEMENT OF 180 URBAN AND INTERURBAN RAILWAYS FOR 1921 COMPARED WITH 1920

	1921	1920	Increase	Per Cent Increase
Railway operating revenue	\$437,493,853	\$434,888,834	\$2,605,019	0.6
Railway operating expenses	329,178,121	340,972,180	11,794,059	3.5
Net operating revenue	\$108,315,732	\$93,916,654	14,399,078	15.5
Net revenue auxiliary operations	16,787,600	15,002,354	1,785,246	12.0
Taxes	30,024,892	27,483,316	2,541,576	9.2
Operating income	\$95,078,440	\$81,435,692	13,642,748	16.7
Non-operating income	9,787,092	9,050,219	736,873	8.1
Gross income	\$104,865,532	\$90,485,911	14,379,621	15.9
Income deductions	82,842,810	82,776,650	66,160	0.08
Net income	\$22,022,722	\$7,709,261	14,313,461	186.0
Operating ratio (per cent)	75.2	78.4	3.2	4.1
Ratio: Net income to operating revenue (per cent)	5.0	1.77	3.33	188.0

Note—Italics denote decrease.

TABLE II—COMBINED INCOME STATEMENT OF 103 URBAN RAILWAYS FOR 1921 COMPARED WITH 1920

	1921	1920	Increase	Per Cent Increase
Railway operating revenue	\$360,001,980	\$353,621,533	\$6,380,447	1.8
Railway operating expenses	268,067,041	277,092,799	9,025,758	3.3
Net operating revenue	\$91,934,939	\$76,528,734	15,406,205	20.2
Net revenue auxiliary operations	12,123,253	10,816,576	1,306,677	12.2
Taxes	25,524,058	23,303,911	2,220,147	9.5
Operating income	\$78,534,134	\$64,041,399	14,492,735	22.7
Non-operating income	8,480,341	7,442,505	1,037,836	14.0
Gross income	\$87,014,475	\$71,483,904	15,530,571	21.7
Income deductions	65,094,550	65,244,583	150,033	0.2
Net income	\$21,919,925	\$6,239,321	15,680,604	252.0
Operating ratio (per cent)	74.4	78.2	3.8	4.9
Ratio: Net income to operating revenue (per cent)	6.1	1.10	5.1	510.0

Note—Italics denote decrease.

TABLE III—COMBINED INCOME STATEMENT OF 77 INTERURBAN RAILWAYS FOR YEAR 1921 COMPARED WITH 1920

	1921	1920	Increase	Per Cent Increase
Railway operating revenue	\$77,491,873	\$81,267,301	\$3,775,428	4.65
Railway operating expenses	61,111,080	63,879,381	2,768,301	3.33
Net operating revenue	\$16,380,793	\$17,387,920	1,007,127	5.80
Net revenue auxiliary operations	4,664,347	4,185,778	478,569	11.43
Taxes	4,500,834	4,179,405	321,429	7.68
Operating income	\$16,544,306	\$17,394,293	849,987	4.88
Non-operating income	1,306,751	1,607,714	300,963	18.72
Gross income	\$17,851,057	\$19,002,007	1,150,950	6.06
Income deductions	17,748,260	17,532,067	216,193	12.33
Net income	\$102,797	\$1,469,940	1,367,143	93.01
Operating ratio (per cent)	78.86	78.60	0.26	0.33
Ratio: Net income to operating revenue (per cent)	0.13	1.81	1.68	92.8

Note—Italics denote decrease.

TABLE IV—COMBINED EXPENSE STATEMENT OF 180 URBAN AND INTERURBAN RAILWAYS FOR 1921 COMPARED WITH 1920

	1921	1920	Increase	Per Cent Increase
Way and structure	\$46,890,514	\$43,750,874	\$3,139,640	7.2
Equipment	41,259,495	44,080,195	2,820,700	6.4
Power	47,874,219	51,881,539	4,007,320	7.7
Conducting transportation	143,153,943	150,057,496	6,903,553	4.6
Traffic	947,415	1,189,383	241,968	20.3
General and miscellaneous	42,645,116	43,950,163	1,305,008	3.0
Transportation for investment credit	94,723	89,221	5,502	6.2
Total operating expenses	\$329,178,121*	\$340,972,180†	\$11,794,059*	3.5

Note—Italics denote decrease.

* Includes \$6,502,142 miscellaneous expenses.

† Includes \$6,151,751 miscellaneous expenses.

TABLE V—COMBINED INCOME STATEMENT ON A CAR-MILE BASIS (IN CENTS) OF 103 URBAN, 77 INTERURBAN AND THE COMBINED TOTAL OF 180 URBAN AND INTERURBAN RAILWAYS FOR 1921 COMPARED WITH 1920

	103 Urban Rys.			77 Interurban Rys.			180 Urban and Interurban Rys.		
	1921	1920	Per Cent Increase	1921	1920	Per Cent Increase	1921	1920	Per Cent Increase
Railway operating revenue	46.5	44.7	4.0	47.5	49.5	4.0	46.7	45.5	2.6
Railway operating expenses	34.6	34.9	0.9	37.5	39.0	3.9	35.1	35.7	1.7
Net operating revenue	11.9	9.8	21.5	10.0	10.5	4.8	11.6	9.8	18.9
Net revenue auxiliary operations	1.6	1.4	14.3	2.9	2.6	11.5	1.7	1.6	6.3
Taxes	3.3	2.9	13.8	2.8	2.6	7.7	3.2	2.9	10.3
Operating income	10.2	8.3	22.9	10.1	10.5	3.8	10.1	8.5	18.8
Non-operating income	1.1	0.9	22.2	0.8	0.9	11.1	1.0	0.9	11.1
Gross income	11.3	9.2	22.8	10.9	11.4	4.4	11.1	9.5	16.9
Income deductions	8.4	8.3	1.2	10.8	10.7	0.9	8.8	8.7	1.2
Net income	2.9	0.9	222.0	0.1	0.7	85.8	2.3	0.8	187.6

Note—Italics denote decrease.

TABLE VI—COMBINED EXPENSE STATEMENT OF 103 URBAN RAILWAYS FOR 1921 COMPARED WITH 1920

	1921	1920	Increase	Per Cent Increase
Way and structures	\$35,899,696	\$33,565,078	\$2,334,618	6.9
Equipment	32,579,011	34,877,432	2,298,421	6.6
Power	38,168,508	41,174,482	3,005,974	7.3
Conducting transportation	120,672,081	126,412,887	5,740,806	4.6
Traffic	444,168	716,407	272,239	58.0
General and miscellaneous	33,928,155	34,332,713	404,558	1.2
Transportation for investment—credit	42,634	27,667	14,967	54.2
Total operating expenses	\$268,067,041*	\$277,092,799†	\$9,025,758	3.3

Note—Italics denote decrease.

* Includes \$6,418,056 miscellaneous expenses.

† Includes \$6,041,467 miscellaneous expenses.

TABLE VII—COMBINED EXPENSE STATEMENT OF 77 INTERURBAN RAILWAYS FOR 1921 COMPARED WITH 1920

	1921	1920	Increase	Per Cent Increase
Way and structures	\$10,990,818	\$10,185,796	\$805,022	7.32
Equipment	8,680,484	9,202,763	522,279	5.67
Power	9,705,711	10,707,057	1,001,346	9.35
Conducting transportation	22,481,862	23,644,609	1,162,747	4.92
Traffic	503,247	472,976	30,271	6.02
General and miscellaneous	8,716,961	9,617,450	900,489	9.36
Transportation for investment—credit	52,089	61,554	9,465	15.97
Total operating expenses	\$61,111,080*	\$63,879,381†	\$2,768,301	4.33

Note—Italics denote decrease.

* Includes \$84,086 miscellaneous expenses.

† Includes \$110,284 miscellaneous expenses.

TABLE VIII—COMBINED EXPENSE STATEMENT ON A CAR-MILE BASIS (IN CENTS) OF 103 URBAN, 77 INTERURBAN AND A COMBINED TOTAL OF 180 URBAN AND INTERURBAN RAILWAYS FOR 1921 COMPARED WITH 1920

	103 Urban Rys.			77 Interurban Rys.			180 Urban and Interurban Rys.		
	1921	1920	Per Cent Increase	1921	1920	Per Cent Increase	1921	1920	Per Cent Increase
Way and structures	4.6	4.2	9.5	6.7	6.2	8.1	5.0	4.6	8.7
Equipment	4.2	4.4	4.6	5.3	5.6	5.4	4.4	4.6	4.4
Power	4.9	5.2	5.8	5.9	6.5	9.2	5.1	5.4	5.6
Conducting transportation	15.6	15.9	1.9	13.9	14.5	4.2	15.3	15.7	2.6
Traffic	0.06	0.09	33.3	0.3	0.3	....	0.1	0.1	....
General and miscellaneous	4.4	4.3	2.3	5.4	5.9	8.5	4.6	4.6	....
Transportation for investment—credit	0.006	0.004	50.0	0.03	0.04	25.0	0.01	0.009	11.1
Total operating expenses	*34.6c.	†34.9c.	0.9	(a)37.5c.	(b)39.0c.	3.9	(c)35.1c.	(d)35.7c.	1.7

Note—Italics denote decrease.

* Includes 0.8 cent miscellaneous expenses. † Includes 0.8 cent miscellaneous expenses. (a) Includes 0.05 cent miscellaneous expenses. (b) Includes 0.07 cent miscellaneous expenses. (c) Includes 0.07 cent miscellaneous expenses. (d) Includes 0.06 cent miscellaneous expenses.

Conditions Improved

Survey for 1921 Shows Greatest Improvement on City Lines—Better Business Conditions Will Help Interurbans.

The financial condition of city electric lines is steadily improving, but this improvement has not yet reached the interurban lines. This is the outstanding fact revealed in the review of conditions in the industry based on official revised operating returns from 180 companies representing more than 50 per cent of the total industry in the United States for the year 1921 and subsequent supplemental reports.

Of these lines 103 are city lines and seventy-seven interurban. Their total operating revenue for 1921 was \$437,493,853, as compared with \$650,149,806 for the entire industry as

ation sees it, however, the figures are merely indicative of the great underlying strength of the industry, the real necessity for the service which it rendered and its ability to withstand serious industrial disturbances.

Traffic on these 180 properties fell from 7,606,190,270 in 1920 to 7,144,332,920 in 1921, a decrease of 6.1 per cent. The total operating expenses of these 180 companies decreased from \$340,972,180 in 1920 to \$327,178,121 in 1921, a drop of 3.5 per cent. The operating ratio dropped from 78.4 per cent in 1920 to 75.2 per cent in 1921.

The net operating revenue as a result of increased revenues and lowered operating expenses increased from \$93,916,654 to \$108,315,732, or 15.5 per cent. Net revenues from auxiliary resources increased \$1,785,246. The surplus created by this increase was

the cost of labor and materials. The cost of conducting transportation of these 180 companies, the principal item in which is wages of trainmen, was \$6,903,353, or 4.6 per cent less than in 1920. The companies ran 18,653,967 fewer car-miles than in 1920. Power costs showed the largest decrease of all the items making up operating expenses.

One-fourth of all passengers riding used transfers, a slight increase over the number using transfers for 1920.

The figures in detail on which the foregoing statements are based are contained in the accompanying tables.

District Merger Agitated Again

The Public Utilities Commission of the District of Columbia is looking into its organic act to determine if it can authorize a merger of the Washington

TABLE IX—COMBINED STATEMENT OF TRAFFIC STATISTICS FOR 103 URBAN, 78 INTERURBAN AND THE COMBINED TOTAL OF 181 URBAN AND INTERURBAN RAILWAYS FOR 1921 COMPARED WITH 1920

	103 Urban Electric Railways			77 Interurban Electric Railways			180 Interurban and Urban Electric Rys.		
	1921	1920	Per Cent Increase	1921	1920	Per Cent Increase	1921	1920	Per Cent Increase
Car-miles (revenue).....	773,852,686	791,817,382	2.3	163,077,867	163,767,138	0.4	936,930,553	955,584,520	2.0
Car-hours (revenue) (a).....	79,988,260	82,166,716	2.7	10,349,271	10,589,509	2.3	90,337,531	92,756,225	2.6
Total passengers.....	6,467,009,091	6,860,771,966	5.8	677,323,829	745,418,304	9.1	7,144,332,920	7,606,190,270	6.1
Revenue passengers.....	5,075,480,639	5,437,465,186	6.7	597,445,113	661,064,968	9.6	5,672,925,752	6,098,530,154	7.0
Transfer passengers.....	1,336,302,729	1,386,635,325	3.6	67,672,399	71,943,167	5.9	1,403,975,128	1,458,578,492	3.8
Miles of single track.....	12,300.0	12,296.3	0.03	6,972.6	6,960.4	0.2	19,272.6	19,256.7	0.08
Cars operated (b).....	18,142	18,715	3.1	1,787	1,803	0.9	19,929	20,518	2.9
Passenger revenue.....	349,685,974	342,180,810	2.2	63,355,620	66,836,868	5.2	413,041,595	409,017,678	0.9

Note—Italics denote decrease.

(a) Car-hours were reported by only ninety-eight city companies and sixty interurban companies.

(b) Cars operated (average maximum number in service daily) were reported by only ninety city companies and fifty-five interurban companies.

reported by the United States Census for 1917.

The actual volume of business shows a slight decrease over 1920, but improved operating conditions have helped finances. The outstanding feature of the combined reports as made public by the information bureau of the American Electric Railway Association is the increase in net income after the payment of all expenses and charges. In 1921 this amounted to \$22,022,722, as compared with \$7,709,261 in 1920. In the face of the unusual business depression in 1921 with unemployment at the maximum, this net income figure is considered remarkable. As the associ-

cut down slightly by an increase of \$2,541,576 in taxes.

The net income of \$22,022,722 earned in 1921 amounted to 5 per cent of the total operating revenue, whereas in 1920 it amounted to only 1.8 per cent.

As for the interurban field, a hopeful sign is the decrease in the operating expenses of these companies, which is relatively greater than that of the city companies.

Expenditures for maintenance of way and structures of 180 companies, both city and interurban, were 7 per cent greater in 1921 than in 1920, while expenditures in other departments show substantial decreases, due probably to

Railway & Electric Company and the Capital Traction Company in Washington. The merger question has been agitated for some time on the ground that it is the only solution for the existing traction difficulties—one company requiring a higher rate of fare than the other, although the commission has prescribed a uniform fare, which yields a greater return to one company than the other. Merger legislation has been proposed in Congress, but no action has been taken owing to conflicting views. The commission has requested the Corporation Counsel of the District for an opinion as to whether its organic act empowers it to merge the two lines.

TABLE X—SOME SIGNIFICANT RATIOS DERIVED FROM THE FIGURES SHOWN IN TABLES I TO IX.

	103 Urban Electric Railways			77 Interurban Electric Rys.			180 Urban & Interurban Elec. Rys.		
	1921	1920	Per Cent Inc.	1921	1920	Per Cent Inc.	1921	1920	Per Cent Inc.
Railway operating revenue:									
Per mile of single track.....	\$29,269	\$28,759	1.8	\$11,114	\$11,167	4.8	\$22,700	\$22,584	.7
Passenger revenue:									
Per revenue passenger.....	6.9c.	6.3c.	9.5	10.6c.	10.1c.	5.0	7.3c.	6.7c.	9.0
Per total passengers.....	5.4	5.0	8.0	9.4	9.0	4.5	5.8	5.4	7.4
Per mile of single track.....	\$28,430	\$27,828	2.2	\$9,086	\$9,602	5.4	\$21,432	\$21,240	1.0
Per car-mile.....	45.2c.	43.2c.	4.6	39.0	40.7c.	4.8	43.6c.	42.8c.	1.9
Per car operated daily.....	\$17,522(a)	\$16,548(a)	5.9	\$22,530(b)	\$24,539(b)	8.8	\$17,971(c)	\$17,250(c)	4.2
Per car-hour.....	\$4.14(d)	\$3.94(d)	5.1	\$4.45(e)	\$4.72(e)	5.7	\$4.18(f)	\$4.03(f)	3.7
Revenue passengers:									
Per mile of single track.....	412,641	442,203	6.7	85,684	94,975	9.8	294,352	316,697	7.0
Per car-mile.....	6.6	6.9	4.4	3.7	4.0	17.5	6.1	6.4	4.7
Per car operated daily.....	252,509(a)	260,034(a)	2.9	226,989(b)	258,932(b)	12.8	250,221(c)	259,938(c)	3.7
Per car-hour.....	59.6(d)	62.0(d)	3.9	45.1(e)	50.2(e)	0.2	58.0(f)	60.6(f)	4.3
Per mile of single track.....	525,773	557,954	6.8	97,141	107,094	9.8	370,699	394,989	6.2
Per car-mile.....	8.3	8.6	3.6	4.1	4.5	8.0	7.6	8.0	5.0
Ratio:									
Transfer passengers to revenue passengers.....	26.4%	25.6%	3.2	11.3%	10.9%	3.7	24.70	24.00	2.9
Car-miles:									
Per mile of single track.....	62,914	64,394	2.3	23,388	23,528	0.6	48,615	49,623	2.0
Per car operated daily.....	38,550(a)	38,071(a)	1.3	56,856(b)	57,211(b)	0.6	40,191(c)	39,753(c)	1.1
Per car-hour.....	9.2(d)	9.1(d)	1.1	11.0(e)	1.8(e)	0.02	9.4(f)	9.3(f)	1.1
Car-hours:									
Per car operated daily.....	4,204(g)	\$4,182(g)	0.5	4,933(h)	5,004(h)	1.4	4,268(i)	4,252(i)	4.0

Note—Italics denote decrease. (a) Ninety companies. (b) Fifty-five companies. (c) One hundred and forty-five companies. (d) Ninety-eight companies. (e) Sixty companies. (f) One hundred and fifty-eight companies. (g) Eighty-eight companies. (h) Fifty-five companies. (i) One hundred and forty-three companies.

Receivers for Queens Lines

Justice Stephen Callaghan, in the Supreme Court at Long Island City on April 28, handed down a decision appointing S. W. Huff, president of the Third Avenue Railway, and Robert C. Lee, an insurance broker, as receivers for the New York & Queens County Railway. The appointment was made on the application of the Guaranty Trust Company, New York, N. Y., as trustee under the first mortgage of the Steinway Railway of Long Island City, dated 1892. In its application for a receiver the Guaranty Trust Company declared that the company defaulted on Jan. 1 in the payment of \$45,000 interest due on the mortgage of \$1,500,000.

New York Bankers Acquire Power Company Control

A. E. Fitkin & Company, New York, N. Y., have acquired control of the Tide Water Power Company, Wilmington, N. C., a city of 35,000 population, it was announced on April 27. The properties taken over in the deal include an electric light and power plant, a gas plant and electric railway systems serving the North Carolina city and interurban territory. The interurban line runs 12 miles to Wrightsville Beach on the ocean, where the company has an amusement pier, a casino and a large auditorium for convention purposes.

Discuss Purchase of Market Street Railway by City of San Francisco

The question of the best methods of procedure in the acquisition of the Market Street Railway by the city of San Francisco has been the subject of recent conferences between city and company officials. The city has been represented by George Lull, city attorney, and the company by William Von Phul, president, and William N. Abbott, chief counsel.

The plan of purchase now being discussed is based upon the method provided for in charter amendment No. 30 passed by the voters on Nov. 2, 1920. A \$14,000,000 bond issue would have to be passed to pay off the company's indebtedness that falls due in 1924 and the remainder of the purchase price would be paid out of the earnings of the system on the pay-as-you-go basis, the city to contract to pay a guaranteed amount each year.

The \$14,000,000 bond issue would require a two-thirds vote. The bonds could be made to cover a period of years ample for the city to redeem them. It would also be necessary to amend the city charter to allow the city to operate the San Mateo branch of the company which goes outside city limits.

The price has not been decided, but it is expected to be in the neighborhood of \$40,000,000. This is the value of the property as estimated by M. M. O'Shaughnessy, city engineer. If that were to be the agreed price the city would pay \$14,000,000 in bonds in

1924 and the remaining \$26,000,000 out of earnings of the utility. Mr. Lull states that this would be the most advantageous method of procedure for the city and would be well within the city's limit of bonded indebtedness.

Joliet & Eastern Traction Stops Service

The Joliet & Eastern Traction Company, Joliet, Ill., operating a 23-mile interurban line between Joliet and Chicago Heights, discontinued service on April 15. Permission to cease operation and junk the property was given by the Illinois Commerce Commission when it was shown that the road was no longer financially able to continue business. The petition for discontinuance was filed with the commission by Receiver Eckmann several months ago. The road will be dismantled in the near future.

The action on the part of the railway was brought about by the coincident necessity for the expenditure of a considerable sum of money for changes in its property that in no way would benefit the railway or increase the value of its service. The largest expenditure impending was at Matteson, where the railway would have been obliged to remove its overhead construction to allow the elevation of the tracks of the Illinois Central Railroad. Other obligations, such as paving charges, track changes, etc., caused by city improvement, have come also at this time. The railway exhausted its reserve some time ago and has been operated at a loss, though every means of increasing the revenue has been tried. Besides its passenger service, the railway was giving a freight and package service and carrying the mails.

The underlying reason for discontinuing operation, however, as stated by E. H. Stearns, secretary of the company, was the increased use of private automobiles. Their popularity and number have rapidly been increasing and the completion soon of a cement highway paralleling the railway's right-of-way will make electric interurban service still more impracticable. The railway has also had to operate in competition with the Michigan Central Railroad and the Elgin, Joliet & Eastern Railroad between Joliet and Chicago Heights.

The company's property consists of 25 miles of single track, five motor passenger cars, three motor freight cars and two other cars. The company purchased energy from the Public Service Company of Northern Illinois. The repair shops were located at Frankfort.

The company was incorporated in Illinois in 1914. It represents the reorganized portion of the Joliet & Southern Traction Company, operating between Joliet and Chicago Heights. The property was appraised by the Illinois Commission, which authorized stock to be issued to the amount of \$269,000 and additional \$31,000 for cash received. There is outstanding \$300,000 capital stock, but no bonds.

Resumes Partial Payment

The Third Avenue Railway, New York, N. Y., resumed partial payment of interest on the adjustment 5 per cent bonds this month, with the payment of 1½ per cent. There still remains 22½ per cent interest on these bonds in arrears, which must be paid before there can be any return to the stockholders. However, the critical stage of the affairs of the company is past. These facts were contained in a letter to a stockholder who suggested that a protective committee of fifteen be organized. S. W. Huff, the president, stated that since the company is not in the hands of receivers the directors are in fact the stockholders' committee. The company also has protested against the valuations placed on the properties of the Transit Commission in a letter by Mr. Huff to the commission. Mr. Huff makes the statement that the cost to reproduce the property even with allowances for depreciation would be more than twice the amount recommended by the engineers for the commission.

Toledo \$87,000 Ahead for March, 1922, Over Similar Month in 1921

As a result of March operations of the Community Traction Company, Toledo, Ohio, there has been added to the fare stabilizing fund \$13,549, an increase over the credit for February of \$8,619. Gross revenue for the month amounted to \$307,827 as compared with gross revenue for February of \$281,196, the increase in this instance being entirely due to the greater number of days in March.

The ratio of operating expense to gross income of 69.405 per cent was a slight decrease from the operating ratio for the month of February.

During the month there were operated 639,656 car miles as compared with 574,221 for the previous month. Revenue passengers per car mile of 7.76 represents a decrease of 0.15 passenger per car mile as compared with February.

During the month there were carried 4,965,140 revenue passengers while for the same month last year there were carried 5,710,010, a decrease of 744,879. By reason of operating economies and despite the decrease in riding it was possible to show a surplus of more than \$13,000 for March this year as compared with a deficit of \$73,755 for the same month last year.

Ordinance requirements as to credits to the various funds and reserves have been complied with, and, in addition, interest earned on bonds retired amounting to \$745 for the month has been added to the sinking fund.

Seeks Termination of Receivership

The Binghamton (N. Y.) Railway has announced its intention of applying for the sale of the property and the discharge of the receiver.

Traffic and Transportation

Fares Discussed in Dallas

City Contends Company Has Not Lived Up to the Terms of Temporary Fare Increase

Hearings are now being conducted in Dallas, Tex., before the City Commission on a proposal to order the Dallas Railway to restore the 5-cent fare as provided in the franchise granted in 1917. The hearing was opened by the city when it was disclosed that the Dallas Railway had used \$500,000 of its earnings under the 6-cent fare over and above the 7 per cent authorized return under its franchise, in payment of past-due dividends.

The company claimed that the franchise guaranteed a return of 7 per cent on its investment, and that all unpaid dividends should be paid out of excess earnings before any of such earnings were used in improvements, betterments or for any other purpose.

The city in turn claimed that the 6-cent fare was granted in 1920 under the express provision that the earnings thus made possible would be used in street paving and other improvements ordered by the city and claimed by the company to be impossible because of inadequate returns.

At the opening of the hearing, Attorney J. A. Worsham, representing the railway, filed a lengthy statement setting forth the position of the company. To the statement was appended a table showing receipts and disbursements for 1921.

The statement, as read by Mr. Worsham, attacked the fairness of the 1917 franchise given the company by the city on the grounds that its provisions do not afford a sufficient maintenance and depreciation fund. The statement stressed the point that under the 6-cent fare a maintenance fund of only \$9,000 is on hand, when the company claims a sum of \$1,000,000 should be afforded. Mr. Worsham said:

It has been proved that the authorized return of 7 per cent that the company receives under the terms of the franchise now in force is inadequate, and that 8 per cent would be a fairer rate. The company can barely subsist on the present schedule, and the reduction of the fare to 5 cents will lead to bankruptcy for the company and total loss to its stockholders.

The property value stated in the franchise is \$9,333,000, while the actual property value is closer to \$13,000,000. The whole thing is simply a matter of calculation. The amount of return necessary to operate this business successfully is a formula that can be deduced from a consideration of the property value involved, the receipts, the disbursements and the depreciation that must be allowed for.

The question of fare is not contractual. We maintain that instead of a 7 per cent return, 8 per cent would be fairer, and that at least 4 per cent should be allowed for depreciation to property and 2 per cent for depreciation of buildings.

Interesting testimony regarding the condition of the Dallas Railway's properties was given by Richard Meriwether, vice-president and general

manager. Mr. Meriwether said that when the Dallas Railway was first requested in the fall of 1920 to assist the city in the paving of certain streets on which it had tracks, it was unable to do so because it had no funds and no credit. It will be able to help now to the extent of \$101,000, Mr. Meriwether said, because it will be able to borrow this sum from its stockholders.

In summing up the situation confronting the company Mr. Meriwether said:

The company is in an embarrassing financial position now, and unless relieved within the next two years, in some manner, the situation will become gravely embarrassing. There is \$60,000 due on Lamar Street improvements now, for example, and only \$9,000 available, unless we are permitted to borrow from the stockholders.

The 18 per cent reserve that has been set aside under the terms of the 1917 franchise is not enough to care for the actual repairs to rolling stock and tracks.

Two of the leading lines in the city, the Ervay line and the Bryan line out Live Oak, are in bad condition. They must be repaired. They each make about \$21,000 a month. The Bryan line situation could be taken care of by routing the cars across Cantegral and down Swiss, but there is no way to meet the Ervay Street emergency. These are two of the heaviest traveled routes in the city.

All the officers have discussed the fact that the property is wearing out and that there are no funds available to replace it. The stockholders know that the company is skating on very thin ice. The rate payer of the past hasn't been made to do his part. A collapse of the company will not only be a calamity to the stockholders but to the public as well.

The money disbursed to the stockholders belonged to them under the terms of the franchise. The fund that it was applied on is still \$558,000 in arrears.

Some of the double-truck cars in the city now have been in service for eighteen or twenty years. The company owns 138 double-truck cars and sixty-eight single-truck. It leases fifty big double-truck cars from the old Northern Texas Traction Company. These latter cost probably \$6,500 apiece. The others about \$5,000. The life of the average car is twenty years, and about 25 per cent of those now in operation here should be replaced.

Right to Examine Books Established

Through an order by Judge H. D. Dickinson of the district court on April 21, the city attorney will have only one day to examine the books of the Twin City Rapid Transit Company, Minneapolis, in case they are produced, before the hearing on an alternative writ of mandamus petition. The proceedings have been established to disclose the relationship between the Minneapolis Street Railway and the Twin City Company. The judge on April 21 continued the time for the company to answer a motion to show why the books should not be produced to April 24. The other hearing had been set for April 25, the day following. The city wants to inspect these books and records to prepare its case for the mandamus suit hearing. The company alleges these books have nothing to do with the Minneapolis Street Railway case. The extension of time was given on request of counsel for the railway.

Commutation Rate Fixed

New Jersey Board Authorizes Monthly Ticket Based on Modification of Muscatine Plan

As an experiment in evolving a satisfactory plan of providing necessary revenues, the Board of Public Utility Commissioners of New Jersey has granted permission to the New Jersey Central Traction Company to establish a base rate of 10 cents in each of its seven fare zones with a form of commutation ticket under which lower rates may be obtained by more frequent riders. The new plan is to be put into operation within four weeks and is to receive a six months trial.

The plan authorized by the board is that riders desiring to do so may purchase a commutation ticket, paying \$1 for each zone in which they desire transportation. The commutation ticket so issued is to be good for one calendar month and is to entitle the holder to transportation for not more than 100 rides a month at the rate of 5 cents per ride. Any passenger traveling beyond the zone covered by his commutation ticket will be required to pay the base rate of 10 cents. Under the plan a person holding a commutation ticket for one zone, for which he pays the monthly flat rate of \$1, will pay a total of \$6 if he takes 100 rides a month, or a 6-cent fare.

The commutation rate would increase in proportion to the diminishing number of rides, so that a person riding only twenty times a month would pay the base rate of 10 cents. The commutation plan suggested by the company as a substitute for a flat increase in fare contemplated the purchase of commutation tickets for \$1.50 in each zone. This plan would have resulted in a minimum fare of 6½ cents, instead of 6, and the base rate of 10 cents would be reached by the passenger riding thirty times a month instead of twenty times, as under the \$1 rate fixed by the commission.

In behalf of the objecting municipalities it was contended that the proposal to charge \$1.50 a zone was too high and would discourage the purpose of the entire plan. In this estimate the board assumed that 22 per cent of the total cash fares would become commutation fares. It also assumed that holders of commutation tickets would ride more frequently, causing an increase of 20 per cent among such riders. Of the remaining 78 per cent not holding commutation tickets the commission assumed that 10 per cent would cease riding due to increase in fare. The net result of this computation would give the company a total annual revenue of \$389,752, instead of a revenue of \$311,694 for the past year.

The company asked for a rate yielding a total revenue of \$400,000 a year. The commission believed, however, that the rate established may reasonably be expected to provide the full amount which the company deems necessary for its continued successful operation.

Weekly Pass Suggested for Use in Fort Smith

By a vote of two to one the City Council of Fort Smith, Ark., has ordered the Fort Smith Light & Traction Company to attend a hearing on rates to be held on May 13. The company's proposal for a three months tryout of the weekly pass plan was disregarded by the commissioners.

At the hearing on rates a return to a 6-cent fare was proposed, but the order was changed to a formal notice to the company to appear in a hearing on rates, when the city attorney told the commission that it could not change the rate without a three days notice and a formal hearing.

D. C. Green, manager of the company, and Judge Joseph M. Hill, its attorney, indicated that the company will contest through the courts any change in its schedule which results in a reduction in revenue.

Mayor Fagan Bourland voted against the motion to bring about a reduction in fare, stating that if the company was making money he would be the first one to vote for a reduction. He called attention to the fact that figures had been presented and sworn to by the company's auditor showing that the company is not making a fair return on its investment.

The hearing was occasioned by a petition for a return to the 5-cent fare.

Manager Green proposed to issue a weekly pass for \$1.25.

Steady and continuous reduction in revenue was shown by figures presented by Mr. Green and sworn to by the company's auditor.

Railway Criticised for Not "Selling" Its Rides

Walter Jackson argues for the retention of the 5-cent radial fare and the use of the weekly pass in Bridgeport in three articles written for the Bridgeport *Post* at the solicitation of the editor of that paper and contributed to the issues of April 21, 22 and 24. He considers the present fare plan, with ameliorations here and there, to be excellent for traffic stimulation, but thinks that it lacks the advantages of the pass in this respect and that the Connecticut Company has been lax in advertising the existing service.

Praise for Ed Walker

The *Terre Haute Tribune* said some mighty nice things about the local traction line, in charge of E. M. Walker, in a recent issue. The occasion for this comment was the announcement by the Terre Haute Traction & Light Company of its decision to install the weekly pass. A considerable part of the editorial was devoted to telling about the pass itself and how it would benefit the public. Some of the more complimentary things in the editorial are contained in the following extract:

While many traction lines are asking for increased rates, the Terre Haute lines, which, by the way, have never advanced

the fare over 5 cents, are striking out for more business at the 5-cent fare or less. In other words, the traction company desires a more general use of the cars.

It is interesting to know that the local traction lines are in a position to offer this mutually advantageous proposition. Many such concerns are going the other way, demanding higher rates and resorting to other such extremities to keep out of receivership. It is certain the public here will not only meet the idea half way, but will be appreciative of this unusual manifestation of mutual interest by a public utility.

Injunction Against Jitneys Made Permanent

Kansas City, Mo., ordinances regulating jitneys on the streets of the city have again been upheld by the local courts. On April 17 Judge Nelson E. Johnson of the Circuit Court made permanent a temporary injunction issued by him on Nov. 10, 1921, restraining operators from violating the two jitney ordinances and from conducting business as jitneys on the streets contrary to the provisions of the ordinances. The order is especially significant on the point of violating "by mere subterfuge, shift or device, including, among others, the subterfuge of accepting as a 'gift,' 'gratuity' or otherwise compensation for carrying persons in their cars."

Jitney operators have been running since Nov. 10 without ostensibly charging for their service. The court makes it very clear that the intent is to regulate the "jitney business" and that the operation of jitneys is obviously a business transacted on the public streets. The decision is made against the jitneys on the basis of the right of the city to regulate the use of its streets.

City and Company Argue Abandonment

The City Council of Carlisle, Pa., answered the threat of the Valley Railways, Lemoyne, Pa., to discontinue its service within the city of Carlisle, by telling the company it must do one of two things: discontinue service on all lines in Carlisle and as far east as Boiling Springs, or continue the present service unchanged.

The Council says that the charter of the Cumberland Valley Electric Passenger Railway, which the Valley Railways is operating, calls for service from Boiling Springs to Carlisle and in Carlisle. The charter also states that the company must pay for paving required between the company's tracks. Recent bills of the Council call for paving which would cost the company \$11,000. This amount the company said it could not pay, and would withdraw its service to the borough limits. The franchise, however, requires the company to restore the streets to their original condition after tearing up the tracks and poles and taking down the wires. This, according to the Council, would cost the company \$44,000.

It would abandon the Cave Hill line, which gives a local service, from the interurban line within the Carlisle city limits, according to its present plans. The interurban operates from Fort Washington to Carlisle.

Fare Injunction Case Being Argued

Application of the Chicago Surface Lines for an injunction against the 6-cent fare order was argued in the United States District Court on April 24 before Judges Evans, Page and Geiger. The hearing was to be concluded later in the week, as the effective date of the order was set originally as May 1.

This is the order entered by the Illinois Commerce Commission on April 8 which proposed to limit the return of the surface lines to 5 per cent and to cut out certain operating expenses so as to make the charging of a 6-cent fare possible.

The companies' attorneys insisted that such a rate would be confiscatory. They also attacked the conclusions of the commission that the lower rate would attract 50,000,000 additional passengers and that no allowance had been made for the expense of this extra burden. Counsel for the city argued that the new rate should be tried and if it resulted in a loss the companies could be compensated.

Mayor Thompson of Chicago has announced that he and members of his cabinet will visit New York City in the near future as guests of Mayor Hylan in the study of local transportation facilities and how they are handled on a 5-cent fare.

300 New Cars Needed, According to Commission Expert

Need for 311 more steel cars on the Brooklyn Rapid Transit Company's subway and elevated lines was expressed on April 24 by Walter T. Edgerton, assistant supervising inspector for the New York Transit Commission at the commission's hearing into the adequacy of the service now being furnished by the company. These are needed, Mr. Edgerton said, in addition to the 900 cars which the company says it will have in service within thirty days, and the total should not include cars that are laid up for repairs but the number that are actually in daily use on the tracks.

Mr. Edgerton also pointed out variances in the service of the Brooklyn Rapid Transit. He said that on some days there might be a fair service in handling the rush hour crowds to Manhattan in the morning, while the service in the evening would be entirely inadequate.

Mayor Hylan also took occasion to step into Brooklyn Rapid Transit matters on April 24 when he wrote to John P. O'Brien, Corporation Counsel, suggesting an investigation into the expenses incurred by the receiver of the company. His suggestion follows the suit instituted a few days ago by Lindley M. Garrison, the receiver, against the city for \$30,000,000 damages for failure by the city to carry out its part of the contract under which the rapid transit lines are operated under lease from the city.

Personal Mention

More Honors for E. A. Robert

Popular and Efficient Leader of Many Montreal Utility Companies Is Elected President of Quebec Railway, Light, Heat & Power Company

The most talked of man in Montreal these days is E. A. Robert, president of the Montreal Tramways, who was recently elected president of the Quebec Railway, Light, Heat & Power Company. His prominence in the business and financial world comes from the fact that he has developed the Montreal Tramways into an organization unique on this continent. While most public utility companies have during the past ten years found themselves in rather straitened financial circumstances, from a combination of causes, and while in many cities a state of public opinion has grown up which is inimical to the success of such enterprises, Mr. Robert has not only emerged from the war period with his company in splendid financial shape, but public opinion within the sphere of the company's operations is such that residents of Montreal openly boast of the service provided.

When the war broke out the company was face to face with the greatest problem in its history—the problem of obtaining a new franchise. For some years agitators had been at work in Montreal, as in many cities in the United States, trying to stir the public up to blocking the legitimate demands of the company and to favoring the municipalization of the system. But these agitators found two obstacles in their way: First, the inherent distrust of the people of Quebec Province to public ownership, with all its attendant inefficiency and heavy taxation; secondly, the fact that the Montreal Tramways system had, under the Robert régime, been run with such splendid operating efficiency and such regard for the comfort of its patrons that the public felt it would be nothing short of disastrous to take the system out of its hands and turn it over to inexperienced operators.

Before the comprehensive plan could be adopted that had been worked out for keeping the facilities of the company abreast of the growth of the city, it was necessary that the company should be assured as to the terms under which it could operate in the future, and until a new franchise was made this matter would remain in doubt. Therefore only such routes were decided upon for construction as were imperative. The main effort of the company was directed to improving the operating capacity of the existing lines, and this was done by a progressive rearrangement of running schedules and by enlarging the capacity of the cars themselves, but the changes were made only after a comprehensive study had been made by officials of the company of practices in cities elsewhere.

About seven years ago Montreal civic officials were approached regarding the granting of a new franchise to the company. There was some opposition to the granting of a new one until the expiration of the old one in 1922. After considerable controversy, without any result, it was decided to refer the matter to the Quebec Legislature, which body, after being assured of the



E. A. ROBERT

support of both, business and labor organizations in Montreal, appointed a special commission to draw up the terms on which to base a new franchise. The commission took the best part of a year to study the whole situation, with the help of the leading authorities on the subject, and after preparing the terms of the contract it was submitted to the Provincial Government. The proposals were adopted, with some minor amendments. The franchise is recognized as a model one in every respect, as it provides ample protection both for the city and the company. This franchise was adopted in 1918 and is working out to the thorough satisfaction of all concerned.

Every year for a long time past experts from all over the country have come to Montreal to inspect the system, and it is the general verdict that for comfort and efficiency the Montreal Tramways is in the first rank. The cars are clean, roomy, airy, splendidly lighted and comfortably heated in cold weather. In winter snowstorms, for which Montreal is noted, they run on schedule just as in summer, for the snowfighting equipment of the company is the last word in efficiency.

While Mr. Robert has made a success of the Montreal Tramways he has not confined his activities to this phase of business life. He first attracted public attention some sixteen years ago, when he undertook to enter the power field in Montreal by developing the water power of the Beauharnois Canal and distributing it in the vicinity of Montreal. His efforts at first were not taken very seriously, as there were powerful corporations occupying the field he proposed to enter. However, he soon demonstrated that he meant business, and from time to time in the face of strenuous opposition he moved from one success to another until to-day he heads a group of power companies that is rapidly becoming a factor not only in the city of Montreal but throughout many portions of the province. With the acquisition recently of the huge Carillon power, some 40 miles from Montreal, from which can be developed 250,000 hp., Mr. Robert becomes an outstanding figure in the hydro-electric power situation in Canada, especially as he proposes immediately to proceed with the consolidation of all the power plants under his presidency and the development of the Carillon plant.

About ten years ago Mr. Robert interested himself with the tramway and power situation in Halifax, N. S., and in 1917 formed the Nova Scotia Tramways & Power Company, Ltd., operating the tramway, light, power and gas services in Halifax and the adjoining city of Dartmouth. He resigned from the presidency of this company in 1919 in order to devote his entire time and attention to the more important tramway and power situation in Montreal and throughout the province of Quebec.

As another evidence of public appreciation of his ability and enterprise, he was during the past month offered the presidency of the Quebec Railway, Light, Heat & Power Company, which operates the street railway, light, power and gas systems in Quebec City and district. The invitation not only came from the executive and shareholders but from the citizens as expressed publicly by the Mayor. Mr. Robert's acceptance of the position means that the same aggressive policy he has displayed in Montreal in railway and power development will be applied to utilities in the city of Quebec.

Mr. Robert was born fifty-seven years ago at Beauharnois, Que., a village about 30 miles from Montreal, and has always been identified with the financial and industrial life of Montreal. He is a member of the leading clubs in Montreal and Quebec and sat for two parliaments in the Provincial Legislature.

Mr. Robert is president of the Montreal Tramways & Power Company, Montreal Tramways Company, Canadian Light & Power Company, Montreal Public Service Corporation, Beauharnois Light, Heat & Power Company, Imperial Trust Company and Quebec Railway, Light & Power Company.

Commission on Interstate Traffic Appointed

Governor Edwards of New Jersey has appointed the members of the State Transit Commission, authorized by an act of the last Legislature introduced by Senator Smith, Passaic, for the purpose of bettering traffic conditions between the counties of Bergen, Essex, Middlesex, Morris, Passaic and Union in New Jersey and New York City. The members appointed are Walter M. Dear, Jersey City; Capt. Harry Hatcher, Hoboken; Herbert S. Swan, Glen Ridge; Spaulding Frazer, Newark; Archibald Cox, Plainfield; Bertran H. Saunders, Paterson, and Daniel A. Garber, Ridgewood.

The bill was introduced as a supplement to the Port Authority plan. It was the opinion that the traffic should be considered in co-operation with that development. The measure provided that the Governor should appoint seven commissioners for the purpose of making an investigation and then report a scheme whereby the conditions of travel in the area affected by the Port Authority would be bettered.

Pacific Electric Makes Changes

The title of T. J. Day, general freight agent of the Pacific Electric Railway, Los Angeles, Cal., has been changed to freight traffic manager, and the title of O. A. Smith, general passenger agent, changed to passenger traffic manager.

T. F. Sullivan Is Boston's Transit Chief

The Transit Department of Boston, Mass., has a new chairman in the person of Thomas F. Sullivan. Mayor Curley, in appointing Mr. Sullivan to succeed Edmund Billings, who resigned, said that he was "obliged to acknowledge merit." That recommendation from a political opponent places Mr. Sullivan ace high, for a prophet is usually not without honor save in the ranks of the opposing party.

Mr. Sullivan has held the responsible position of Commissioner of Public Works until recently. He laid out the first comprehensive plan of rebuilding radial highways from Boston to all outlying suburbs. More than that, he reduced the engineering and inspection forces in the city departments under his charge and established a system of promotion on merit, which eliminated political consideration entirely.

Long service with the Boston Elevated Railway has given Mr. Sullivan a concrete and valuable background for his work as chairman of the transit board. From 1899 to 1918 he was associated with different departments of the railway, serving first as clerk and timekeeper, later as chief clerk and assistant superintendent of tracks. From 1912 until he left the company's service to become Commissioner of Public Works he was roadmaster. He assumed his latest position on April 1.

Louis K. Rourke, formerly Commis-

sioner of Public Works, and Francis E. Slattery, with Mr. Sullivan, make up the personnel of the transit commission.

Mr. Sullivan served in the Santiago campaign during the Spanish-American War and commanded the Tenth Regiment, Massachusetts State Guard, during the European War.

Four Philadelphia Changes

Four appointments have been announced by the Philadelphia Rapid Transit Company, effective April 15. F. W. Johnson becomes assistant to the president. He will continue as editor of "Service Talks." R. T. Senter is appointed assistant to the president on special assignment, E. J. McIlraith superintendent of Rolling Stock and Buildings Department and J. H. M. Andrews superintendent of the Way Department.

K. Y. Abe, chief engineer of the Tokyo Underground Railroad of Japan, is in the United States studying examples of tunnel construction. His company is planning the construction of a 10-mile tunnel under Tokyo's main street. The construction of the Japanese tube will be through sandy soil. Mr. Abe stated that the construction would cost \$20,000,000 and would require five years to complete.

H. Flynn, auditor of the Georgia Railway & Power Company, Atlanta, has been appointed assistant comptroller. F. A. Brine has been advanced to the post of auditor. Mr. Flynn has been with the company for more than twenty years. Mr. Brine entered the company in 1901. George S. Jones, Jr., has been made commercial engineer and will have charge of the sale of electric power.

T. C. Berkeley of the English Electric Company is now in the United States and Canada studying rolling stock and fare practices. Mr. Berkeley arrived October last from England and has been engaged since then as specialist for the Toronto Transportation Commission in addition to having charge of the installation of Dick-Kerr electrical equipment on the Toronto system for his firm. He is also engaged in electrical work for the Ontario Hydro-Electric Commission. His headquarters are at 319 Transportation Building, Montreal.

W. J. Baldwin, assistant general manager of the New Orleans Railway & Light Company, has taken up his new work as director of public information for the Alabama Power Company, Birmingham. Mr. Baldwin has had newspaper experience as reporter for various papers in Georgia cities, and for some time owned and published a weekly paper at Hurstboro, Ala. The New Orleans *Daily States* said, upon Mr. Baldwin's departure, that "during Mr. Baldwin's connection with the railway company here, he displayed marked executive ability. His sound judgment contributed largely toward unraveling some of the perplexities which sprang up from time to time in the operation of the properties at New Orleans."

Obituary

William Howard Watson, for many years treasurer of the old Buffalo Street Railway, Buffalo, N. Y., died recently. He was 73 years old. He also had been treasurer of the Bell Telephone Company.

Leslie Richards, superintendent of the Bloomington & Normal Railway & Light Company, Bloomington, Ill., died recently. Mr. Richards was a car operator for eleven years before he became superintendent.

Robert Brisbane, senior construction superintendent for the J. G. White Engineering Corporation, died in New York, N. Y., recently. He was in charge of the construction of the station of the Radio Corporation of America at Bolinas, Cal., which was completed a short time ago. Mr. Brisbane came to America in 1906 from Scotland.

H. F. Beakey, chief of the secret service of the Interborough Rapid Transit Company and New York Railways Company, New York, N. Y., died recently. Mr. Beakey was chief of the secret service of the old Manhattan Railway from 1896 to 1902, later taking charge of the watchmen for some time. Mr. Beakey became chief of the secret service department of the New York Railways when it was formed in 1912 and took over the Metropolitan Street Railroad.

Major Thomas B. Lee, a leader in the field of civil engineering in the South, died at his home in Charlotte, N. C., March 13, 1922. His age was 87 years. Major Lee was in active practice of his profession up to the time of his death, and as a construction engineer had been connected with some of the largest and most important undertakings in the South. He was born at Camden, S. C., and was educated at the Citadel, Charleston. After his graduation he had his first practical experience in railroad construction with the old Blue Ridge Railroad from Anderson, S. C., to Knoxville, Tenn., in 1865. He had charge of the construction of the Seaboard Air Line Railroad from Monroe, N. C., to Atlanta, Ga., which line he subsequently extended to Birmingham, Ala. He concluded the last section of this work in 1905. Shortly after coming to Charlotte in 1905, Major Lee became actively associated with his nephew, W. S. Lee, vice-president and chief engineer of the Southern Power Company. In 1910 he became chief engineer of the Piedmont & Northern Railway and had charge of construction of this road from Charlotte to Gastonia, N. C., and from Spartanburg, S. C., to Greenwood and Anderson in that state. On the completion of this work he resumed his private practice, which he continued until his death.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

Several Large Orders for Rolling Stock Placed

Information just received indicates that purchasers of rolling stock are again becoming active. Some of the recent orders reported are fifteen merchandise cars for the Chicago, North Shore & Milwaukee Railroad, ordered from the Cincinnati Car Company. This road is also considering the purchase of twenty-five additional passenger cars. The Chicago Elevated Railways is considering the purchase of 100 passenger cars. The Brooklyn Rapid Transit Company has arranged with George Tontrup for the conversion of 150 of its 28-ft. double-truck cars to one-man operation. The work includes the lengthening and closing in of the semi-vestibuled platforms. This work will be done at the Coney Island shops of the railway. Fifteen cars were also recently purchased for service in Lafayette, Ind.

Trade Terms to Be Defined

A preferred list of trade terms commonly used in the business world will soon be issued by the trade terms committee of the International Chamber of Commerce, according to information just received by the American Section of that organization. In commenting on this proposed publication, the American Section says, in part:

"For many years the business men of all countries have been caused a great deal of inconvenience and in many cases financial loss by the various interpretations given to the terms or abbreviations used in shipping and quotations on overseas transactions.

"The more commonly used terms involved in international trade are: f.o.b.; f.a.s.; c.i.f.; c.&f.; l.c.l.; f.o.r. and f.o.t. Probably the best known and most used of all these is f.o.b., which, by virtue of long tradition, means in England 'free on board boat.' To indicate the same meaning in the United States the word 'vessel' is added, and in this latter interpretation other member countries of the International Chamber concur. The paramount importance of a mutual understanding of such terms as this is evidenced by a case recently decided in which an Australian had purchased certain goods f.o.b. from an American firm. The latter charged trans-shipment expenses and others, over and above the price agreed upon; the Australian, considering that he had bought the goods to be delivered free on board vessel, refused to pay the additional expense until forced by the courts to do so. The foregoing is but one of many cases that could be cited in which, despite the bona fides of international traders, disagreements have

arisen through different interpretations of term in universal use.

"The International Chamber will make clear the accepted meanings of the terms in each country and will set up a preferred list of definitions most commonly accepted, leading to universal understanding on this important matter."

The Coal Situation

Last week's flurry in the bituminous market is subsiding. Interest at first centered around Pittsburgh, where an active demand existed, with high volatiles leading the list, due to the urgent fuel needs of the Steel Corporation. The call soon spread to other steel companies and to low-volatile coal. So much tonnage became immediately available that cancellation orders are now forthcoming and coal has lost its top-notch quotations of last week.

In the Middle West stocks are dwindling and consumers are feeling a little uneasy, as indicated by a growing number of inquiries. Eastern coals are not so plentiful following the inroads made by steel mill orders. Domestic coal is difficult to sell and the many no-bills of lump in southern Illinois are being worked off very slowly. Mine-run and steam grades are on a price par with domestic coals in the union producing regions.

There is no trade awakening in the Northwest. Dock shipments are light and price cuts made to stimulate business have had little effect. Dockmen are becoming uneasy lest some of their stocks be on hand when the strike is settled. About 500,000 tons of coal is in Lake vessels and 3,000 cars (about 150,000 tons) are at the lower ports awaiting dumping. With this reinforcement to dock stocks consumers are not apprehensive of a shortage and are not buying in excess of current needs.

\$750,000 Track Program for Toledo

Toledo car riders will not have to pay the repaving costs between street car tracks, it was learned on April 19 at the meeting of the public improvement committee of the Council, when Street Railway Commissioner Cann announced a \$750,000 improvement program during the present year.

The repaving cost will be borne by general tax payers and automobile owners who use the pavements. It was argued by Commissioner Cann, and the Council committee concurred, that if the Community Traction Company paid the repaving bills it would come out of the car riders' pockets and this was unfair because it is the other class of persons who destroy the pavement.

Commissioner Cann says the improvement program includes laying of new foundations and new tracks and repair of old tracks which are in good shape so far as wear is concerned. More than 1,700 tons of new rails have been ordered, the commissioner announced.

\$150,000 for Electric Railway Improvements in Knoxville

The officials of the Knoxville Railway & Light Company have announced that, following an agreement between the officials and the City Commission, improvements will be made costing approximately \$150,000. The plan includes the granting by the city of a franchise in the center of North Central Street for a line that is to be moved from the east side of the street. This line was constructed under a franchise granted by the county. The county franchise will be relinquished and the tracks will be moved to the center of the street on a franchise to be granted by the City Commission.

The Park Avenue line of the Knoxville Railway & Light Company is also to be reconstructed. Steel rails and other materials are to be obtained which are necessary for this work.

Car Building Plant Ordered Sold

The properties of the Barney & Smith Car Company, Dayton, Ohio, will be sold at auction by order of Judge Edward T. Snediker of the Common Pleas Court, Montgomery County, to meet a \$2,000,000 bond issue underwritten by the Guaranty Trust Company, New York.

The trust company was awarded judgment for \$1,835,196, representing outstanding bonds and \$156,737 interest, from which \$321,540 was deducted from previous sales of the car company assets. Bids are to be received for amounts of two-thirds of the appraised value. They must be accompanied by a \$50,000 deposit. The upset price has not yet been fixed by the court.

The car company originally went into the hands of a receiver on June 23, 1913, as a result of the March, 1913, flood. The receivership was lifted two years later, but again put into effect in 1919. During 1921 a bondholders' protective committee was formed to plan a reorganization, but insufficient subscriptions resulted in abandonment.

Metal, Coal and Material Prices

Metals—New York		April 25, 1922
Copper, electrolytic, cents per lb.	12.875	
Copper wire base, cents per lb.	14.125	
Lead, cents per lb.	5.375	
Zinc, cents per lb.	5.375	
Tin, Straits, cents per lb.	31.125	
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.	\$4.80	
Somerset mine run, Boston, net tons.	2.70	
Pittsburgh, mine run, Pittsburgh, net tons	2.75	
Franklin, Ill., screenings, Chicago, net tons	1.875	
Central, Ill., screenings, Chicago, net tons	2.50	
Kansas screenings, Kansas City, net tons	2.50	
Materials		
Rubber-covered wire, N. Y. cents per lb.	5.90	
Weatherproof wire base, N. Y., cents per lb.	15.50	
Cement, Chicago net prices, without bags.	\$1.97	
Linseed oil, (5-bbl. lots), N. Y., cents per gal.	91.00	
White lead, (100-lb. keg), N. Y., cents per lb.	12.25	
Turpentine (bbl. lots), N. Y., cents per gal.	84.00	

Rolling Stock

Kentucky Traction & Terminal Company, Lexington, Ky., purchased ten cars from the Cincinnati Car Company, as announced in the *ELECTRIC RAILWAY JOURNAL* for Feb. 4, 1922. Additional details regarding the equipment and size of these cars are now available as follows:

Number of cars ordered.....	10
Name of road.....	Kentucky Traction & Terminal Company.
Order placed	October, 1921
Delivered	February, 1922
Builder of car body.....	Cincinnati Car Company.
Type of car.....	Motor—full convertible
Seating capacity	44
Weight:	
Car body	12,257 lb.
Trucks	7,800 lb.
Equipment	5,043 lb.
Total	25,100 lb.

Bolster centers, length.....	21 ft.
Length over all	40 ft. 3 in.
Truck wheelbase	5 ft.
Width over all	8 ft. 6 1/2 in.
Height, rail to trolley base.....	12 ft. 2 in.
Body	All steel
Interior trim.....	Cherry, mahogany finish
Headlining	Agasote
Roof	Arch
Air brakes.....	General Electric CP-27 safety car complete.
Armature bearings.....	General Electric, CP-27 sleeve.
Axles.....	Cincinnati Car Company A.S.T.M. specifications.
Bumpers.....	Cincinnati Car Company 6 in. channel.
Car signal system.....	Faraday 4-V, Edison battery.
Car trimmings.....	Cincinnati Car Company oxidized brass.
Center and side bearings.....	Cincinnati Car Company friction.
Control.....	General Electric, K-35, H.H.
Couplers.....	Cincinnati Car Company stationary pocket.
Curtain fixtures.....	Curtain Supply Company, protected groove
Curtain fixtures.....	Curtain Supply Company, pantasote-J.
Designation signs.....	Electric Service Supply, Keystone I. L. R.
Door operating mechanism.....	Safety Car & Equipment Company.
Fare boxes	None
Fenders or wheelguards.....	Cincinnati Car Company pilot.
Gears and pinions.....	General Electric grade M.
Hand brakes.....	Cincinnati Car Company
Heater equipment.....	Holden & White C.H. type.
Headlights.....	General Electric Company J-12, 500 watt.
Journal bearings.....	United Lead Company (Frary metal), M.C.B.
Journal boxes.....	Symington M.C.B., 3 x 6
Lightning arresters.....	General Electric Company aluminum cell.
Motors.....	General Electric 264, four per car
Motors	Inside hung
Paint.....	Acme white lead and color
Registers.....	Ohmer No. 60
Sanders.....	Cincinnati Car Company
Sash fixtures.....	Cincinnati Car Company wedge type.
Seats.....	Hale & Kilburn, No. 108. Spec.
Seating material	Plush
Slack adjuster	None
Springs.....	Union Spring & Manufacturing Company.
Step treads.....	Cincinnati Car Company aluminum pat., No. 548
Trolley catchers.....	Ohio Brass Company
Trolley base.....	General Electric Company U. S. No. 15
Trolley wheels or shoes.....	Holland Trolley Supply Company 6 in. wheel.
Trucks.....	Cincinnati Car Company arch bar
Ventilators.....	Cincinnati Car Company West Penn type.
Wheels.....	Standard Steel Company steel, 26 in.
Special devices, etc.....	Marker lights, 6-8 v., 4 c.p.
Lights	6-8 v., 2 c.p. operated by Edison Storage Battery, 3 cell, 4 v.

San Diego (Cal.) Electric Railway has placed an order for ten more Birney safety cars with the American Car

Company. This will bring the total of the Birney safety cars in use here to thirty-five. Electric equipment for the new cars is to be furnished by the General Electric and Westinghouse Companies, each furnishing 50 per cent.

Electric Short Line Railway, Minneapolis, Minn., has bought three all steel gaso-electric motor cars with a seating capacity for 100 persons. They are valued at \$100,000 and can make 65 miles an hour.

Cincinnati & Dayton Traction Company, Hamilton, Ohio, has just placed in service the first of fifteen safety cars purchased from the National Safety Car & Equipment Company of St. Louis, Mo.

Pacific Electric Railway, Los Angeles, Cal., has ordered 200 National gondola dump cars. The cars will have steel underframes and wooden sides. They will be 40 ft. long and 8 ft. 9 in. wide, and will be used for hauling gravel and crushed rock.

Boston Elevated Railway, Boston, Mass., has just ordered 100 semi-convertible cars from the J. G. Brill Company of Philadelphia. It is stated that these cars will weigh 30,000 lb. and cost approximately \$10,000 each. Delivery is expected in August. The construction is arranged so that these cars can be utilized for one-man operation if found desirable. Platforms will be provided with double doors and the cars will have wider aisles than safety cars. It is stated that these are intended to replace the articulated type of cars now in operation.

Track and Roadway

Kitchener, Ont.—The City Council approved of the extension of the Waterloo & Wellington Railway through to Guelph.

Georgia Railway & Power Company, Atlanta, is required to repave Lee Street from Park Street to McCall's Crossing, in a Supreme Court decision recently handed down.

Harrisburg (Pa.) Railways expects to start work in a few days in reconstructing 1 1/2 miles of city track and overhead construction. The material required has already been ordered.

Southern New York Power & Railway Corporation, Oneonta, N. Y., expects to start construction soon of 1,600 ft. of new track to be laid in pavement and three concrete and steel bridges.

Carolina Power Company, a subsidiary of the Carolina Power & Light Company, Raleigh, plans to extend its tower line from Sanford to Badin to transmit power purchased from the Tallahassee Power Company.

Public Service Railway Company of New Jersey has begun reconstruction of the Haddonfield line in Westmont on the Camden division. More than 1,000 ft. of new track has already been laid and the work is progressing rapidly.

Interstate Public Service Company, Indianapolis, Ind., will be required to take up the unused car track on East Fourth Street from Spring to Main Streets in New Albany. The Council adopted an ordinance to this effect.

Springfield (Mass.) Street Railway. Petition for a franchise to lay tracks around Court Square Extension to provide a loop for traffic across the new Connecticut River bridge was postponed until May by unanimous vote of the Board of Aldermen on April 17.

Frankford, Tacony & Holmesburg Street Railway, Philadelphia, Pa., expects to rebuild about 2 miles of track, with 7-in. 105-lb. Lorain section grooved rail. An order has already been placed for 100 tons of rail, and the remainder will follow later.

Ford City, Ont.—T. U. Fairlie, railway engineer for the Hydro-Electric Power Commission of Ontario, estimates the cost to Ford City of moving the tracks from the side of Ottawa Street to the middle of the thoroughfare at \$19,040.

New York (N. Y.) Transit Commission will readvertise at once contracts for construction of the Fourteenth Street Eastern District subway line. The Board of Estimate is returning the contracts to the Transit Commission after refusing to sign them.

Seattle (Wash.) Municipal Railway has received the approval of the city utilities committee of the City Council to reconstruct tracks on Westlake Avenue from Pine Street to Roy Street. An ordinance appropriating \$28,000 from the railway depreciation reserve fund for the purpose was recommended.

Electric Short Line Railway, Minneapolis, Minn., plans to add 50 miles to its line operating from Minneapolis to Hutchinson. Extension has begun to Clara City, Minn., tending toward an ultimate terminus at Madison, S. D. The company will utilize 100,000 ties and 2,500 tons of 70-lb. rail.

Indiana Service Corporation, Fort Wayne, Ind., has asked permission of the Board of Public Works to double track the line on South Wayne Avenue from Creighton Avenue to Kinsmoor. It is stated by S. W. Greenland, general manager, that it is necessary to relay the tracks on South Wayne Avenue and that while doing this it is considered best to double track the line.

Indianapolis (Ind.) Street Railway has been ordered by the Board of Public Works to extend the English Avenue car line from Keystone Avenue to Sherman Drive, a distance of a mile and a half. A number of the delegations of the property owners have presented petitions to the board asking for an extension and it was announced some time ago that the board would grant the extension.

San Diego (Cal.) Electric Railway will start reconstruction work on its tracks about July 1. At the head of the program for improvements presented to Mayor and Council are Park

Boulevard from El Cajon Avenue to Mission Cliff gardens; East San Diego line in two sections, first on University Avenue from Park Boulevard to Thirtieth Street and second from Thirtieth to Daley; National Avenue line from Sixteenth Street and Market to the end of the line.

Duluth (Minn.) Street Railway Company has begun the relaying of its tracks on Superior Street. Seven-inch 93-lb. rail will be used with oak ties laid on a broken-stone foundation. Screw spikes with steel tie plates will also be used, and the joints will be welded by the Thermit process.

Muskogee (Okla.) Electric Traction Company will provide transportation to the bathing beach at Honor Heights this spring and summer. Surveyors are at work on plans for running tracks from the end of the West Broadway line to the site of a \$500,000 soldiers' memorial hospital, and this line will be extended about two blocks further for patrons of the bathing beach.

Knoxville (Tenn.) Railway & Light Company has agreed to move its tracks to the middle of Central Street between Scott and Morelia Avenues at its own expense. The City Commission in return has agreed to grant a right-of-way franchise similar to the existing one. The question of paving between the rails of the new track will be settled later. The company also agreed to rebuild its tracks on Park Avenue from Gay Street to the viaduct and will pave between the rails of each track and between the double track.

Cincinnati, Ohio.—The Board of Rapid Transit Commissioners, has awarded the contract for constructing section five of the rapid transit loop to the Hickey Brothers, Columbus, Ohio. The Hickey Brothers were awarded the contract, although their bid was \$12,823 higher than that of the lowest bidding company, but members of the commission said that their bid was the best. The lowest bid came from the J. T. Adams & Winchell Company, Columbus, Ohio. The Hickey Brothers' bid was \$323,680 while the engineer's estimate was \$399,635.

Trenton, N. J.—The State Public Utility Commission has denied the application of the City of Trenton, N. J., to compel the New Jersey & Pennsylvania Traction Company to lay additional tracks on West Hanover Street, to relieve congested traffic and alleged consequent danger to the public. The board said that much of the straight track and some of the special work soon must be reconstructed. Then the proper rearrangement can be made. The board said that the existing conditions were not sufficiently dangerous to justify the necessary expenditure for making the proposed change at this time, particularly in view of the financial condition of the company. The city's estimate of the cost was \$38,236.40, plus 20 per cent for contractor's profit. The company's estimate was \$75,000.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has started on its program of extensions by the replacing of special work at East Water and Michigan Streets. This job consisted of the placing of a new double track crossing with connecting curves on the southwest and northwest corners and is done to permit the rerouting of the Vliet Street cars, which are now operating by way of Third Street, Sycamore, Michigan and East Water Streets to the South Side, returning the same way. In this program of replacements will be the rebuilding of the curves and tracks at Reed and National, at West Water and Grand, and at several other important corners. It is also planned to extend the Center Street line from Sherman Boulevard to Fifty-first street, with a double track. The new work at East Water and Michigan Streets will cost some \$35,000; that at Reed and National, about \$50,000; that at West Water and Grand some \$40,000 and the extension of the Center Street tracks about \$40,000 without paving.

Shops and Buildings

Harrisburg Railways Company, Harrisburg, Pa., is installing two new Heine boilers with high furnace combustion chambers and Cox stokers, made by the Combustion Engineering Company.

Columbus, Delaware & Marion Electric Company, Columbus, Ohio., will spend \$500,000 in improvements at the new power plant in Scioto, 7 miles south of Marion. The plant originally cost \$1,000,000.

New York, N. Y.—Nine bids have been submitted to the Transit Commission in connection with the construction of additional stations and elevators on the Brooklyn-Seventh Avenue subway line, the Fourteenth Street-Eastern line and the miscellaneous work on various rapid transit lines. The highest bidder was George Colon & Company, \$235,109. The lowest bid received was submitted by Joseph S. Brown, \$207,792.

Wilkes Barre & Hazleton Railway, Hazleton, Pa., has been asked to arrange for the work necessary on switches and sidings from its line to connect with a new million dollar substation at Ashley Plains which will be put up by the Pennsylvania Power & Light Company. This substation will step down the high-tension current delivered by the Harwood power house to Wilkes-Barre. Work on the high-tension line has already been started.

Municipal Railway of St. Petersburg, Fla., will be driven by municipal current if the recommendations of a committee appointed by the City Commission are carried out. The committee has returned from a tour of Florida's municipally-owned power plants and has gone into the St. Petersburg situation with prospects for added demands due to the growth of the street railway. It advises the build-

ing of a 1,500 kilowatt plant immediately to furnish power for the municipal enterprises—street car line, gas plant, waterworks and street lighting—upon expiration next January of the present contract with the St. Petersburg Lighting Company. With this view in mind an electrical engineer has been called in to go into the situation and report to the commission, which is willing to call an election for bonds up to \$300,000 for such plant. C. T. Baker is the consulting engineer who has been secured.

Oregon Electric Railway, Portland, Ore., has placed an order for automatic substation equipment, said to be the largest single order for automatic equipment of this kind ever placed in this country. Seven stations at present manually operated will be equipped with synchronous converters. These stations, which have been in operation since 1912, range in capacity from 500 to 1,000 kw., and generate power for the 180 miles of interurban system of the company at 1,200 volts, direct current. The automatic equipment will include separate exciters for the synchronous converters to insure correct polarity at starting and will be designed along standard lines for present railway practice. The equipment at each station will consist essentially of a motor-driven drum controller, exciter, contactors, switches and relays with protective devices and load-limiting resistors. The stations will be cut in on the line or shut down according to the demand for power, which will vary with the number of cars operating on the line.

Trade Notes

Johnson Fare Boxes.—The Chicago Surface Lines has arranged with the Johnson Fare Box Company for a trial installation of fifteen electrically driven fare boxes. These are of a new design providing instantaneous registration.

The Ohio Brass Company, Mansfield, Ohio, states that its cars will be used O. A. Lawrie as district sales manager in the New England territory with headquarters in Boston. For the past sixteen years Mr. Lawrie has been with the American Copper Products Company.

The Westinghouse Electric & Manufacturing Company has received an order for 50,000 suspension insulators from the Southern California Edison Company, Los Angeles, Cal. The insulators will be used in the reinsulation of 275 miles of high-tension line, to increase from 150,000 to 220,000 volts.

Differential Car Company, Findlay, Ohio, states that its cars will be used in Cleveland and Toronto this summer for hauling wet concrete from a central mixing station. Experiments made in Cleveland last fall indicate that the character of the concrete is not changed in transporting even with a maximum elapsed time between the mixer and ground of eighty-three minutes.

Western Electric Company, New York, N. Y., announces the appointment of Edward B. Craft as chief engineer. This appointment is the result of a reorganization of the administrative department by which the operating functions are divided among four major departments. Dr. F. B. Jewett, vice-president of the company, has charge of the telephone department; vice-president H. A. Halligan has charge of the purchasing, traffic, legal, accounting, treasury and publicity personnel; F. A. Ketcham, general sales manager, takes charge of the supply department, and G. E. Pingree, vice-president and general manager of the International Western Electric Company, has the foreign department.

Wagner Electric Manufacturing Company, St. Louis, Mo., is advertising the Pow-R-Full Motor, which provides a pull box as a part of the motor frame into which the leads of the motor extend. The box may be turned in four directions for conduit connections. The advertisements of the motor accentuate the fact that vibration has been very largely eliminated and that the motor runs quietly.

Dutchess Bleachery, Inc., Wappingers Falls, N. Y., announces that its insulation division has taken over the sales of its products which were formerly sold through American Di-Electrics, Ltd. The new coating plant at Wappingers Falls has a present capacity of 2,000,000 yd. per year, which includes varnished fabrics of all standard gages and widths. Additional equipment is in the course of construction.

Westinghouse Electric & Manufacturing Company has separated the divisions of power and railway at the Pittsburgh office, and some new appointments have been made. Barton Stevenson, who previously was manager of both divisions, will continue as manager of the power division. F. G. Hickling has been appointed manager of the railway division, and S. R. Shave will act as manager of the price section for both divisions.

Combustion Engineering Corporation, New York, N. Y., has recently completed arrangements with the Power Plant Equipment Company, Kansas City, Mo., whereby that company will represent the corporation in that territory which covers, in a general way, eastern Kansas, eastern Nebraska, western Arkansas, and western Missouri. This district was taken over by the Power Plant Equipment Company on March 1, 1922. The Kansas City address of the Combustion Engineering Corporation is 1002 Coco-Cola Building.

Ford, Bacon & Davis, New York, N. Y., a firm of specialists in engineering and management of public utility and industrial business, outlines the facilities at hand and scope of service it is prepared to render in a booklet just issued. The company handles investigations, reports and valuations, organization, financing and development, engineering designing and planning, con-

struction, accounting and management. Another booklet describes the United States Army supply base at New Orleans, La., which the company is constructing.

Roller-Smith Company, New York, N. Y., announces the following changes in its sales organization: The Perkins-LeNoir Company, which formerly represented the Roller-Smith Company in Philadelphia, has been succeeded by Esherick & Hoyle, Otis Building, who will handle the company's line of electrical instruments, meters and circuit breakers in the Philadelphia territory. The Perkins-LeNoir Company, which formerly represented the Roller-Smith Company in Baltimore, has been succeeded by J. E. Perkins, 113 E. Franklin Street, who will handle the company's line of electrical instruments, meters and circuit breakers in the Baltimore territory.

Railway Audit & Inspection Company, Philadelphia, Pa., has announced the following officers for this year: E. C. Hathaway, chairman of the board; H. N. Brown, president; T. C. Cary, first vice-president and general manager; C. H. G. Larrimore, assistant general manager; C. E. Horney, second vice-president and treasurer; George W. Reif, secretary. The field covered by the company was divided as follows: K. H. Wendling, managing central division; I. F. Heidler, supervisor central division, Frick Building, Pittsburgh, Pa.; W. B. Edwards, assistant manager central division, Perry-Payne Building, Cleveland, Ohio; P. H. Diehl, manager western division, Webster Building, Chicago, Ill.; F. W. Stockmar, assistant manager western division, Railway Exchange Building, St. Louis, Mo.; Harry Preston, manager southern division, Candler Building, Atlanta, Ga.; J. P. Graham, district manager, Drovers & Mechanics National Bank Building, Baltimore, Md.; J. H. Cain, district manager, Little Building, Boston, Mass.; C. E. Harbison, district manager, Candler Building, New York City, N. Y.; L. D. Rice, district supervisor, Brown Brothers Building, Philadelphia, Pa.

Heine Boiler Company, St. Louis, Mo., is distributing a reprint of a message from C. R. D. Meier, president of the company, to Heine boiler salesmen. This contains a discussion on present business conditions and includes diagrammatic curves of wholesale prices in the United States for 110 years.

Electric Railway Equipment Company, Cincinnati, Ohio, has issued a folder giving construction details and installations of Elreco combination railway and lighting poles, and ornamental brackets. A list of cities which have these in use is given, together with illustrations of the completed installations.

Heine Boiler Company, St. Louis, Mo., has issued a folder entitled "Forty Years of Progress." This contains information on several new developments in boiler design and announces a change in the name of the company which was previously Heine Safety Boiler Company. The change consists in dropping the word "Safety."

Ingersoll-Rand Company New York, N. Y., has issued bulletin describing the Price type "PO" horizontal single cylinder oil engine. One of the outstanding features of these engines is the shape of the combustion chamber and the arrangement and construction of the spray nozzle used for direct injection of fuel.

The Page Steel & Wire Company has just issued a new handbook giving information on Page-Armco welding rods and electrodes. This gives information on the various products manufactured, the sizes, weights, etc., together with specifications for welding rods and electrodes as issued by the American Welding Society, and tests for welding electrodes.

Uehling Instrument Company, Paterson, N. J., has recently issued Bulletin 112, covering Uehling CO₂ recording equipment, for guiding the engineer and fireman in reducing the waste of fuel up the chimney. Features are the separate recorder for the engineer's office and indicator for the boiler front, continuous chart record and dry method of absorption.

Atlas Valve Company, Newark, N. J., is distributing a small booklet giving information on reducing-valve economy. Information is given on the flow of steam through pipes, together with handy tables for determining the size of pipe needed. Information is also given on superheated steam, extra heavy pipe, pipe fittings, leaders to heating systems, pipe friction allowances, and steam velocities.

Westinghouse Electric & Manufacturing Company has just published some electrification data in Vol. III, No. 2, of its *Data* publications. This points out the value of electrification of railroads as a means of conserving energy and contains information regarding desired standards for railroad electrification and discussion as to the future of railroading and existing electrifications.

New Advertising Literature

Schutte & Koerting Company, Philadelphia, Pa., has issued a flyer showing the straightway valve being marketed by that company.

Westinghouse Union Battery Company, Swissvale, Pa., has issued Bulletin No. 1102 descriptive of its radio batteries and Bulletin No. 1201-A descriptive of its storage batteries for farm lighting.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has published a folder on Shurvent fuses. The folder explains the application and design of fuses for the protection of low-voltage circuits up to 600 volts for both alternating and direct current.

**POWER
SPEED
CAPACITY**



**PEACOCK
Staffless Brakes**

Designed exclusively and especially for the light-weight safety car—occupies minimum platform space, yet furnishes an emergency braking power equal to the remarkable air brake equipment. Full braking power can be applied almost instantly. Unlimited chain-winding capacity overcomes the worst condition of slack in the rigging.

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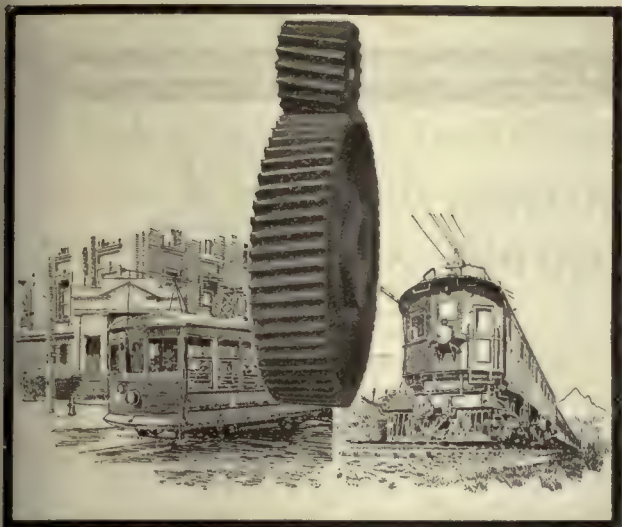
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Nuttall Helical Gearing, manufactured since 1914 in a constantly increasing volume, has conclusively demonstrated its superiority in every class of railway service.

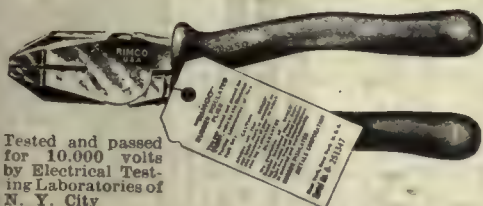
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- (a) $7\frac{1}{2}^\circ$ angle long and short addendum type teeth.
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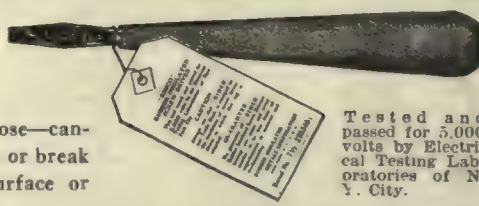
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Tested and passed for 10,000 volts by Electrical Testing Laboratories of N. Y. City

Semi-soft rubber insulation—Bonded to metal by Elchemco Process.

Insulation cannot work loose—cannot come off—cannot crack or break if dropped on a hard surface or from the arm of a pole.



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NEW YORK DETECTIVES BOSTON

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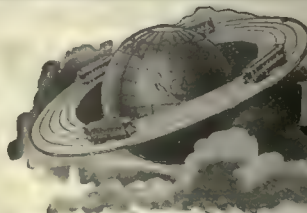
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Demand Guaranteed Butt-Treatment For Your Poles

You can be assured of a longer pole life when your poles are Butt-Treated by a process that *guarantees* half inch uniform penetration of the preservative through the ground-line area.

Specify the "*P & H*" *Guaranteed Penetration Process*, and be sure of getting the *greatest value for your money* in Butt-Treatment.

The metal disc on the butt of every pole is your protection against substitutes. The written guarantee is your assurance of money back if your poles do not show the guaranteed half inch penetration.

INSIST ON THE GUARANTEED THE "*P & H*" PROCESS

We produce and sell treated and untreated Northern White and Western Red Cedar poles—we can give you any form of Butt-Treatment—and we are the originators of the *Guaranteed Penetration Process*—the "*P & H*."

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We invite your attention to certain fundamental principles in track construction which are worthy of consideration—

The foundation, the immediate support and fastening of the rail, the proper protection and support of the joints, the life of the street paving and the initial cost.

Each and every one of these points is given special consideration in the construction of *Dayton Resilient Ties*.

Years of service under the most severe conditions have proven that they are built on sound principles and are fundamentally correct.

DAYTON

JUSTIFIES THE LAYOUT TRACK BUILDING TIME

When track costs per annum equal or exceed interest and investment costs on a new track, then it's time to consider complete reconstruction and—

When you consider new construction you certainly want to do the job right and at the least possible first cost.

You want permanency and freedom from joint repairs and adjacent street paving.

What you want is the coming thing in track construction—Dayton *Resilient* Ties.

Accurate cost figures show that this track saves \$6000 a mile over wood ties in con-

crete and \$2000 as compared with wood ties in gravel ballast.

In addition to these remarkable savings in first cost, Dayton *Resilient* ties insure longer life to track and paving—they reduce to a minimum both track and paving repairs—they reduce traffic noise and upkeep of rolling stock by cushioning the shocks and jars on foundations that lack *resiliency*.

Perhaps a two-cent stamp spent *now* will save you thousands of dollars next month in new track construction. Just drop us a line asking for complete information about Dayton *Resilient* ties.

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Dayton, Ohio

Canadian Representative
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Resilient TIE



Springtime
means more linework

Figure your line renewals now and start getting quotations on materials.

Columbia Ears are made according to well-tested designs. Only fresh metals, correctly alloyed for maximum durability, are used.

Our prices are in line and deliveries prompt.

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The I & D Account



Boyerize It Down!

LOOKING over the Injuries and Damages figures of the big fellows, we see that it runs anywhere from 3 to 7 per cent of the gross income. Means as much as \$3.00 for every 1000 passengers carried.

It's not the platform and step accident any more that makes the biggest hole in the I. & D. pocketbook; it's the run-down, the collision, the bump into valuable property and still more valuable humanity.

Boyerized brake-rigging cuts that kind of accident down. Stands to reason that it must, because Boyerized brake-pins and bushings wear ever so much longer than any other kind you can get—and the longer they wear the less chance they give to the brake-rigging troubles that put your cars beyond control.

Pick One, Pick All!

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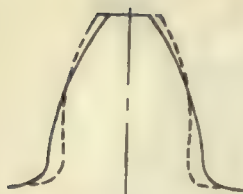
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Springfield, Mass.

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Interurban Railway Style
24 teeth, $2\frac{1}{4}$ pitch, WISDOM-TOOTH
contrasted with
25 teeth, $2\frac{1}{4}$ pitch, standard tooth.



Elevated Railway As Used By Interborough
Rapid Transit Co.
15 teeth, 2.5948 pitch, WISDOM-TOOTH
contrasted with
16 teeth, 2.5948 pitch, standard tooth.



City Railway or Mine Locomotive
15 teeth, 3 pitch, WISDOM-TOOTH
contrasted with
16 teeth, 3 pitch, standard tooth.



"Safety Car" Type
12 teeth, $4\frac{1}{4}$ pitch, WISDOM-TOOTH
contrasted with
13 teeth, $4\frac{1}{4}$ pitch, standard tooth.

Built Stronger — Last Longer

"Tool Steel" Wisdom-Tooth Pinions

will run with your present gears

While the old B & S standard $14\frac{1}{2}^\circ$ tooth may do where gears are not overstressed or subjected to abnormal wear, it is not the strongest tooth available for the abnormal wearing conditions of street railway service. But the thousands of high-grade gears in service with standard B & S teeth cannot be scrapped in order to secure immediate use of more modern tooth shapes, either in 20° angle, in helical or in other types.

"Tool Steel" WISDOM-TOOTH pinions solve this problem by giving a modern shaped pinion tooth and yet one that will run interchangeably with the old gear, quietly, with a normal efficiency in the transmission of energy. The tooth is decidedly stronger than the old standard when new and as it wears, tends to maintain its strength rather than to wear with undercut flanks.

"Tooth Steel" WISDOM-TOOTH pinions have been given careful tests in many types of service, in the railway and mining industry, have been pronounced a decided success in each case and have now been adopted as standard by many large users.

The slight change in gear ratio, due to one less tooth than standard in "Tool Steel" Wisdom Tooth Pinions, will have no appreciable affect on car speeds. It has not affected operating conditions in the slightest in places where it has been actually tried.

Secure them for trial installation

Tool Steel" Quality **T. S. Q.** "Tool Steel" Quality

Tool Steel Gear and Pinion Co.
Cincinnati, Ohio



V-K

THERE are positive and practical advantages in using V-K Trolley Wheels and Non-Arcing Harps.

They are made from a special alloy metal which possesses a quality of toughness that is depended upon to replace that of hardness. The perfect contour of the running groove is always maintained, insuring maximum conductivity.

M-J Wheels are manufactured complete, without resetting, in specially constructed machines, to within one-thousandth of an inch of gauge. Their perfect balance eliminates all vibration or "chatter" on the wire, thus eliminating constant arcing.

V-K Trolley Wheels and Non-Arcing Harps are representative of what is best in design, in material and in manufacture.

*Send for a copy of our Booklet
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MORE-JONES BRASS & METAL CO., ST. LOUIS

"NOT ONLY TO MAKE BETTER PRODUCTS BUT TO MAKE THEM BETTER UNDERSTOOD—NOT ONLY TO SELL BUT TO SERVE, ASSISTING THOSE WHO BUY TO CHOOSE AS WELL AS USE THEIR PURCHASES—THIS IS THE PRIVILEGE IF NOT THE PRACTICE OF ALL MODERN MANUFACTURERS."

—Vauclain.



THE best forgings that can be purchased are the safest for railroad operation. First cost should not be the deciding factor when a road's main purpose is to keep all rolling stock in service.

Every possible precaution is taken by the Standard Steel Works Company in the manufacture of heavy-duty railroad forgings. Our methods of manufacture are your assurance of long lived forgings.

TIRES—WHEELS—SPRINGS—FORGINGS—CASTINGS

The Standard Steel Works Company's Brand on your material is an assurance of eventual economy.

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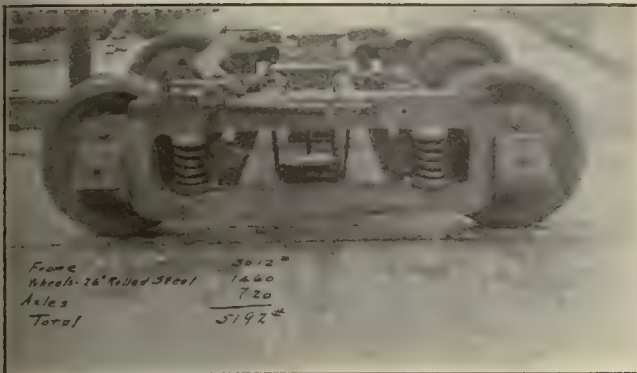
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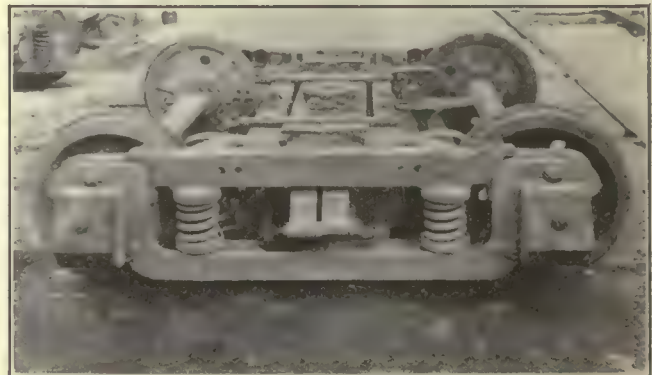
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Motor Truck—Equalized

Cannot Get Out of Square
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 Three-Piece Construction

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 Long Service Without Repairs
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Wrought Iron Equalizers, Special Steel Castings and Carefully Finished Forgings insure long life.

One-piece Frame and Transom

No Joints or Connections to Become Loose.

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St. Louis, Mo.
"The Birthplace of the Safety Car"



Do blind fuses save money?

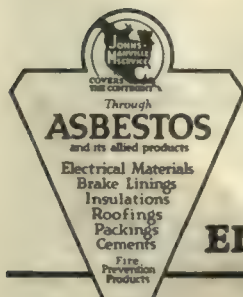
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Inexperienced or careless workmen frequently change an *unblown* non-indicating blind fuse (often throwing it away) and leave the blown fuse in the circuit. The resulting time loss will ordinarily pay for a hundred indicators.

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All Steel Seat
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*Lead the
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that count*

Neatness
Lightness
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Strength
and



Steel Seat
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No Costlier Than Others

*Write
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Hale & Kilburn Corporation

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Works: Philadelphia

NEW YORK
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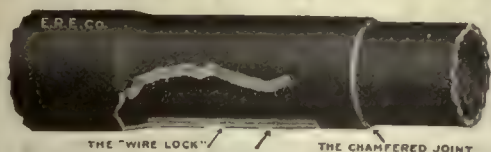
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THE "WIRE LOCK" THE CHAMFERED JOINT

COMBINE
Lowest Cost **Lightest Weight**
Least Maintenance **Greatest Adaptability**

Catalog complete with engineering data sent on request

ELECTRIC RAILWAY EQUIPMENT CO.
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BARE COPPER WIRE AND CABLE

TROLLEY WIRE

**WEATHERPROOF WIRE
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**PAPER INSULATED
UNDERGROUND CABLE**

MAGNET WIRE

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AMERICAN ELECTRICAL WORKS
 PHILLIPSDALE, R. I.

Boston, 116 Federal; Chicago, 112 W. Adams; Cincinnati, Traction Bldg;
 New York, 233 B'way; San Francisco, 612 Howard; Seattle, 100 1st Ave. So.

To Equalize the Load on Two Feeders

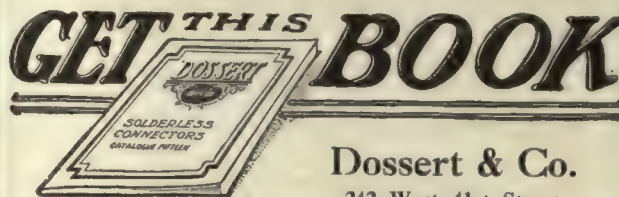
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the

DOSSERT



Solderless Equalizer

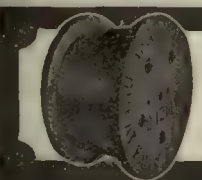
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Single-track block-signal protection
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United States Electric Signal Co.
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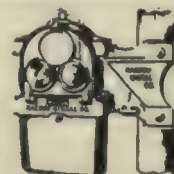
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**Highway Crossing Bells
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Electrical
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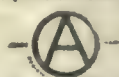
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Your best insurance against insulator breakage

Hubbard & Company
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AETNA INSULATION LINE MATERIAL

Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches.



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289-93 A Street, Boston, Mass.

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Imperial under electric railway.

IMPERIAL Corrugated Riveted CULVERTS

Under the more important stretches of track—where dependability is the chief requisite—there you will find IMPERIAL Riveted Corrugated Culverts. Made of anti-corrosive Toncan Metal, they can be depended upon to give perfect service for years and years. Those installed over fourteen years ago show no signs of rusting thru.

IMPERIALS are made in all of the standard diameters. Can ship within a few days after receiving order. Write for delivered prices.

The Canton Culvert & Silo Co.
—Mfgs.—

Canton, Ohio, U. S. A.

American Rail Bonds

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UNITED STATES
TWIN TERMINAL
SOLDERED
TRIPLEX

Arc Weld and Flame Weld

*Send for new
Rail Bond book*

American Steel & Wire
CHICAGO
NEW YORK
Company

SPECIAL TRACKWORK

Of the well-known WHARTON Superior Designs
and Constructions

STEEL CASTINGS
CONVERTER AND
ELECTRIC

FORGINGS
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AND PRESS

GAS CYLINDERS
SEAMLESS
STEEL

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ORIGINATORS OF
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ERICO CONOMICAL EFFICIENT RAIL BONDS

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Transmission Line and Special Crossing Structures, Catenary Bridges

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Prompt shipment from our own stocks.

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Automatic Retard Switch Stands for Running Signals
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Wires, Cables, Cable Accessories
Superior quality, economical prices
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Indianapolis Economy Products That Make Dollars "Grow"

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Frogs, Crossings, Mates and Tongue-switches. Super-quality material. Par-excellent designs. Gives many lives to one, of ordinary construction, and when worn down, CAN BE RE-STORED by INDIANAPOLIS WELDING.

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Fluxated heat treated Metal Electrodes, insure Uniform Dependable Welds that are from 75 per cent to 100 per cent more efficient, than the "MELT," from the same High Grade basic stock, untreated.

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CABLES, HELMETS, LENSES, CARBONS.

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Ball-bearing, for ash-pits, storage yards, etc.

Indianapolis "Economy" Products

are Pre-eminently "Money Savers." YES—"Money Makers" for Electric Railways.

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of
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of continuing reliability

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Makers of Steam Superheaters
since 1898 and of Chain Grate
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High-Grade Track Work

SWITCHES—MATES—FROGS—CROSSINGS
COMPLETE LAYOUTS
IMPROVED ANTI-KICK BIG-HEEL SWITCHES
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CONSTRUCTION

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Established 1858

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Special Work for Street Railways

Frogs, Crossings, Switches and Mates
Turnouts and Cross Connections
Kerwin Portable Crossovers
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RWB DYNAMOTORS

FOR

CARBON ARC RAIL JOINT WELDING
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CARBON and METALLIC ARC GENERAL WELDING
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Makes permanent, light, level pavement
with a minimum of paving repairs.

The Nelsonville Brick Co.
Columbus, Ohio

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A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits

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Every Little Movement of a heavy piece from car to platform, from platform to truck, from one department to another—takes the efforts and time of well-paid men. A Ford Tribloc cuts down the number and expense of such operations, by lifting, carrying, and lowering weights up to 40 tons—easily, swiftly, and securely.

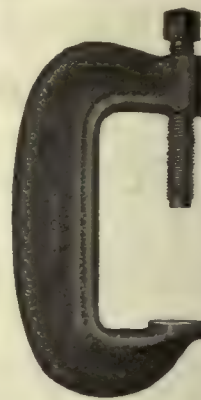
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**ALLIED MACHINERY CO.
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FORD TRIBLOC



Williams' Superior Drop-Forged Clamps

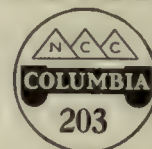
11 Patterns, in a wide range of sizes, for every clamping purpose.

DROP-FORGINGS
often cheaper than castings
—always far superior—

J. H. WILLIAMS & CO.
"The Drop-Forging People"

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CHICAGO 1143 W. 120th St.

RAILWAY MOTOR BRUSHES



Grade 203, produced by research and proved by test, the most satisfactory and lowest cost-per-car-mile brush obtainable for A. C. commutator type railway motors. One of a series of standard railway motor brushes.

COLUMBIA BRUSHES

COST NO MORE — LAST LONGER

NATIONAL CARBON COMPANY, INC.
CLEVELAND, OHIO SAN FRANCISCO, CAL.

STERLING VARNISH

What Is In A Gallon?

Consider what you actually pay for in insulating varnish. What per cent is basic material, what is benzine, spirit or other solvent?

See our page in the March 18th Issue!

The Sterling Varnish Co., Pittsburgh, Pa.

SUPER-SEASONED FIBRE

Peerless Insulation Paper has 25 to 50 per cent higher electrical resist.

Hornflex Insulation Paper has no grain. Folds without cracking.

NATIONAL FIBRE & INSULATION CO.
Box 420 Yorklyn, Delaware.

BUCKEYE JACKS

high-grade R. R. Track and Car Jacks.

The Buckeye Jack Mfg. Co.
Alliance, Ohio

BAKELITE-DILECTO

The fields of usefulness for Bakelite-Dilecto are many and varied because of its superior merit over materials heretofore available in sheets, tubes or rods. The exceptional qualities of Bakelite-Dilecto are satisfying electric railways all over the country. Investigate.

The Continental Fibre Co., Newark, Delaware

Branch Offices:

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CANADIAN OFFICE, 89 Wellington St., W., Toronto, Ont.

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.

Electrical Machinery, Steam Turbines, Steam Engines, Condensers, Gas and Oil Engines, Air Compressors, Air Brakes



I. T. E. Circuit Breakers

for heavy street railway work are the best obtainable. Write for New Complete Catalogue.

SPECIFY THE TERRY TURBINE

For Driving Your Auxiliaries

TERRY STEAM TURBINE CO.
Hartford, Conn.

ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

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POSITIONS WANTED—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

RATE PER INCH for ads in display space:
1 to 3 in., \$4.50 an in. 15 to 29 in., \$3.90 an in.
4 to 7 in., \$4.30 an in. 30 to 49 in., \$3.80 an in.
8 to 14 in., \$4.10 an in. 50 to 99 in., \$3.70 an in.

POSITIONS VACANT

ENGINEER of maintenance of way wanted by city property in Middle West; young graduate civil engineer with some practical experience preferred. P-412, Elec. Ry. Jour., Leader-News Bldg., Cleveland.

POSITION open for superintendent overhead lines. A man with some knowledge of electrical engineering desired. Must be familiar with A.C. and D.C. and understand maintenance of block signals. P-415, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

RAILWAY overhead line foreman wanted. Location, eastern Pennsylvania. Must be capable and able to handle entire overhead railway line work. Application will not be considered unless fully qualified. State salary and send references. P-411, Elec. Ry. Jour., Real Estate Trust Bldg., Phila.

SEVERAL electrical draftsmen wanted by large construction firm building power stations in Central West, will pay from fifteen to twenty-one hundred dollars for men with experience in electrical design in connection with power stations according to ability. Address, giving age, education, experience and salary expected. P-416, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

POSITIONS WANTED

SUPERINTENDENT of transportation with 17 years' experience on large city, suburban and interurban properties, desires a change, very successful in handling employees and public relations; fully capable of taking over details of transportation of any property and producing results. High grade references, personal reasons for desiring a change. PW-417, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

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- 1—500 kw. Westinghouse, 3 phase, 60 cycle, 360 volts, A.C., 600 volts D.C., 400 r.p.m., with 2—300 kw., Westinghouse, 2400/380 volt transformers, also switchboard.
2—300 kw., Stanley, 3 phase, 25 cycle, 360 volts, A.C., 600 volts, D.C.; speed 500 r.p.m., complete, with suitable transformers, also panels.
1—300 kw., Westinghouse, 3 phase, 60 cycle, 370 volts, A.C., 575 volts D.C., 600 r.p.m.

MOTOR GENERATOR SETS

- 2—1000 kw., General Electric Synchronous Motor Generator Sets, each consisting of 1—1000 kw., 600-volt, type MPC, 514 r.p.m., D.C. generator, and 1—1400 kva., 3 phase, 60 cycle, 2300/4000 volt, 514 r.p.m., synch. motor.

Transformers of every voltage for both 25 and 60 cycle.

ARCHER & BALDWIN, Inc., 114 Liberty St., New York City
Telephone 4337-4338 Rector

FOR SALE

MERRY-GO-ROUND

in good operating condition
also tent to cover same.

The Kingston, Portsmouth & Cataraqui
Electric Railway Company
Kingston, Ont.

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HAND BRAKES

111—New Peacock
31—Second hand.

TRANSIT EQUIPMENT COMPANY
501 Fifth Avenue, New York

FOR SALE AT A SACRIFICE

A Large Brass Band

WELTE ORCHESTRION
Replaces a Band of about 15 pieces

THE BEST MUSIC FOR PARKS
IT IS POSSIBLE TO GET

Cost \$6500 Can be shipped at once

For particulars address

TAYLOR, 634 W. 138th St., N. Y. C.

FOR SALE

SECOND HAND CARS

trucks and motors

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Phila., Pa.

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is read by men whose success depends upon thorough knowledge of means to an end—whether it be the securing of a good second-hand piece of apparatus at a moderate price, or an expert employee.

THE BEST PROOF

of this is the variety of this journal's Searchlight ads. Without a constant and appreciable demand for such machinery or services, by its readers, the market place which these advertisements represent could not exist for any length of time. Are you using the Searchlight Section?

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with
Names of Manufacturers and Distributors Advertising in this Issue

- Advertising, Street Car**
Collier, Inc., Barron G.
- Air Receivers & Aftercoolers**
Ingersoll-Rand Co.
- Anchors, Guy**
Electric Service Sup. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Armature Shop Tools**
Elec. Service Supplies Co.
- Axles**
Bemis Car Truck Co.
Cambria Steel Co.
Midvale Steel & Ordnance Co.
St. Louis Car Co.
Standard Steel Works Co.
- Axles, Car Wheel**
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Westinghouse E. & M. Co.
- Axle Straighteners**
Columbia M. W. & M. I. Co.
- Babbitt Metal**
Ajax Metal Co.
More-Jones Br. & Metal Co.
- Babbitt Devices**
Columbia M. W. & M. I. Co.
- Badges and Buttons**
Electric Service Sup. Co.
Internat'l Register Co., The
- Batteries, Dry**
National Carbon Co.
- Bearings and Bearing Metals**
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
More-Jones Br. & Metal Co.
St. Louis Car Co.
Westinghouse E. & M. Co.
- Bearings, Center and Roller**
Side
Stucki Co., A.
- Bells and Gongs**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car-Heating Co.
Electric Service Sup. Co.
St. Louis Car Co.
- Benders, Rail**
Railway Track-work Co.
- Benders, Rail**
Babcock & Wilcox Co.
- Bellows, Tubes**
Cambria Steel Co.
Midvale Steel & Ordnance Co.
- Bond Testers**
American Steel & Wire Co.
Rail Welding & Bonding Co.
- Bonding Apparatus**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Sup. Co.
Indianapolis Switch & Frog Co.
Ohio Brass Co.
Rail Welding & Bonding Co.
Railway Track-work Co.
- Bonds, Rail**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Sup. Co.
General Electric Co.
Indianapolis Switch & Frog Co.
Ohio Brass Co.
Rail Welding & Bonding Co.
Railway Track-work Co.
- Book Publishers**
McGraw-Hill Book Co., Inc.
- Brackets and Cross Arms**
(See also Poles, Ties, Posts, etc.)
Bates Exp. Steel & Tr. Co.
Electric Ry Equip. Co.
Electric Service Sup. Co.
Hubbard & Co.
Ohio Brass Co.
- Brake Adjusters**
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.
- Brake Shoes**
Amer. Br. Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
- Brakes, Brake Systems and Brake Parts**
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
- General Electric Co.**
Johns-Manville, Inc.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.
- Brass & Bronze Products**
American Copper Prod. Corp.
- Brooms, Track, Steel or Rattan**
Amer. Rattan & Reed Mfg. Co.
- Brushes, Carbon**
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
National Carbon Co.
Westinghouse E. & M. Co.
- Brushes, Graphite**
National Carbon Co.
- Brushes Wire Pneumatic**
Ingersoll-Rand Co.
- Brush Holders**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
- Bus Bars**
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- Buses, Motor**
Brill Co., The J. G.
Republic Truck Sales Corp.
- Bushings**
Nat'l Fibre & Insulation Co.
- Bushings, Case Hardened and Manganese**
Bemis Car Truck Co.
Brill Co., The J. G.
- Cables (See Wires and Cables)**
- Carbon Brushes (See Brushes, Carbon)**
- Car Lighting Fixtures**
Elec. Service Supplies
- Car Panel Safety Switches**
Consolidated Car Heating Co.
Westinghouse E. & M. Co.
- Cars, Dump**
Differential Steel Car Co.
- Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Cambria Steel Co.
Kuhlman Car Co., G. C.
Midvale Steel & Ordnance Co.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.
- Cars, Second Hand**
Electric Equipment Co.
Transit Equipment Co.
- Cars, Self-Propelled**
General Electric Co.
- Castings, Brass, Composition or Copper**
Ajax Metal Co.
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Standard Steel Works Co.
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St. Louis Car Co.
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Cutter Co.
General Electric Co.
Westinghouse E. & M. Co.
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Electric Ry. Equip. Co.
Electric Service Sup. Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
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Ohio Brass Co.
- Clusters and Sockets**
General Electric Co.
- Coal and Ash Handling (See Conveying and Hoisting Machinery)**
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Electric Service Sup. Co.
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General Electric Co.
Westinghouse E. & M. Co.
- Coils, Choke and Kicking**
General Electric Co.
Westinghouse E. & M. Co.
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Internat'l Register Co., The
Johnson Fare Box Co.
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General Electric Co.
- Commutators or Parts**
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General Electric Co.
Westinghouse E. & M. Co.
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General Electric Co.
Ingersoll-Rand Co.
Westinghouse Tr. Br. Co.
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Ingersoll-Rand Co.
- Concrete Reinforcing Bars**
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Midvale Steel & Ordnance Co.
- Condensers**
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse E. & M. Co.
- Connectors, Solderless**
Dossert & Co.
Westinghouse E. & M. Co.
- Connectors, Trailer Car**
Consolidated Car Heating Co.
Electric Service Sup. Co.
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Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.
- Controller Regulators**
Electric Service Sup. Co.
- Controlling Systems**
General Electric Co.
Westinghouse E. & M. Co.
- Converters, Rotary**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.
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- Copper Wire**
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- Cord, Bell, Trolley, Register, etc.**
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Internat'l Register Co., The
Roebbing's Sons Co., J. A.
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- Cord Connectors and Comp-lers**
Electric Service Sup. Co.
Samson Cordage Works
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Ohio Brass Co.
Westinghouse Tr. Br. Co.
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- Crossing Manganese**
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- Crossing Signals (See Signals, Crossing)**
- Crossings, Frog and Switch**
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- Crossings, Track (See Track, Special Work)**
- Crushers Rock**
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Canton Culvert & Silo Co.
- Curtains and Curtain Fix-lures**
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Electric Service Sup. Co.
Morton Mfg. Co.
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Electric Equipment Co.
- Derailing Devices (See also Track Work)**
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- Destination Signs**
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Electric Service Sup. Co.
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Wish Service, P. Edward
- Dogs, Lathe**
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Nat'l Pneumatic Co., Inc.
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General Electric Co.
Hale & Kilburn Corp.
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Arnold Co., The
Beeler, John
Day & Zimmermann
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Hemphill & Wells
Holst, Englehardt W.
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Witt, Peter
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Johns-Manville, Inc.
Westinghouse E. & M. Co.
Williams & Co., J. H.
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Columbia M. W. & M. I. Co.
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Westinghouse E. & M. Co.
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Standard Steel Works Co.
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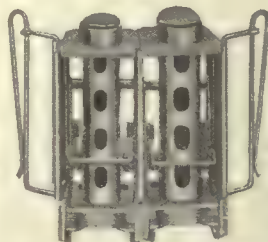
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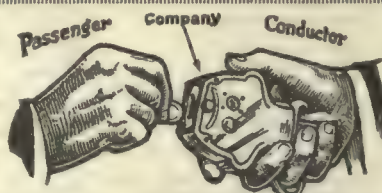
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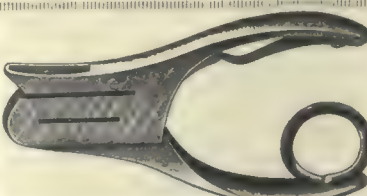


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Wood Co., Chas. N.

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(See Track Special Work)

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General Electric Co.
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Westinghouse E. & M. Co.

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Smith Heater Co., Peter

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Tie Plates
Cambria Steel Co.
Midvale Steel & Ordnance Co.

Ties Mechanical
Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel
Barbour-Stockwell Co.
International Steel Tie Co.

Ties, Wood Cross (See Poles, Ties, etc.)

Tongue Switches
Wharton, Jr. & Co., Wm.

Tool Holders
Williams & Co., J. H.

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Cambria Steel Co.
Midvale Steel & Ordnance Co.

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Rubber Insulated Metals Corp.

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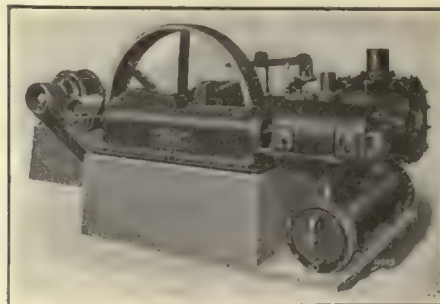


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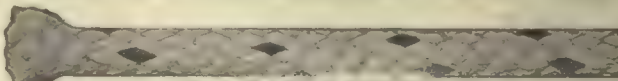
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